

 Amplify Desmos Math CALIFORNIA

Grade 4

Volume 2: Units 5–7

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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Amplify gratefully acknowledges the work of distinguished program advisors from English Learners Success Forum (ELSF), who have been integral in the development of Amplify Desmos Math. ELSF is a 501(c)(3) nonprofit organization whose mission is to expand educational equity for multilingual learners by increasing the supply of high-quality instructional materials that center their cultural and linguistic assets.

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Hello Curious Mind,

Welcome to Grade 4!

Your view of the world is starting to become more varied and complex, just like the numbers and operations you'll work with this year!

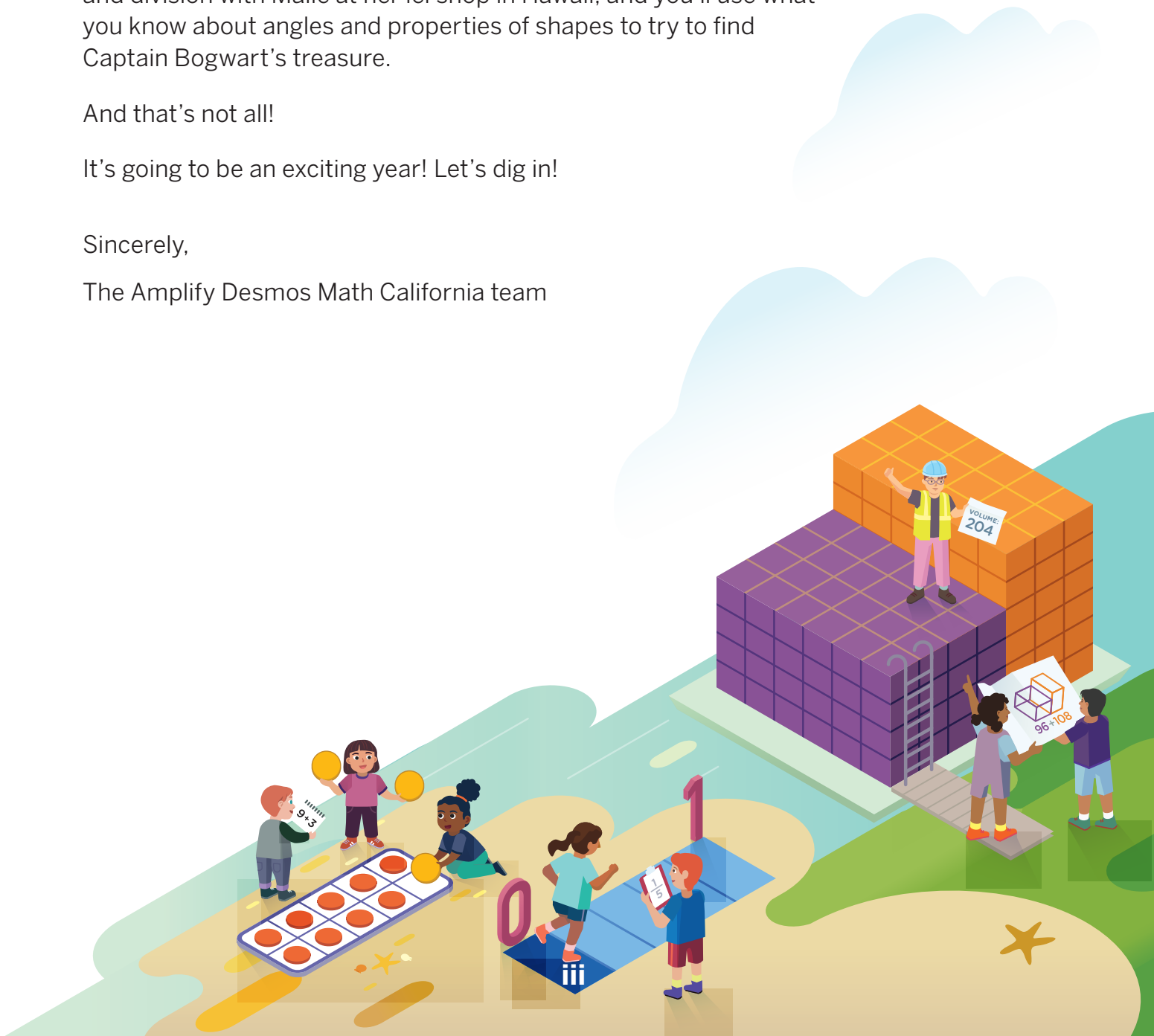
You'll get to explore fractions as you run with Ingrid, work with numbers up to 1 million as you swim with sea turtles, and solve problems involving making homes for hamsters. You'll also explore number patterns with Mel — a fourth grader just like you — and help Henry work with fractions as he takes care of a new plant. You'll explore multi-digit multiplication and division with Maile at her lei shop in Hawaii, and you'll use what you know about angles and properties of shapes to try to find Captain Bogwart's treasure.

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 Factors and Multiples

Let's use what we know about multiplication and division to work with factors and multiples.

Unit Story: I Contain Multitudes In this story, Mel talks about who she is, through the context of her favorite number.



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Followtheflow/Shutterstock.com

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Unit 2 Fraction Equivalence and Comparison

Let's find fractions that are equivalent and compare all types of fractions.

Unit Story: One Step at a Time In this story, Ingrid overcomes challenges as she trains for a race.



XONIX/Shutterstock.com



romakoma/Shutterstock.com

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Traveller70/Shutterstock.com

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Craig Sterken/Shutterstock.com

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Unit 3 Extending Operations to Fractions

Let's learn how adding and subtracting fractions is similar to adding and subtracting whole numbers. Let's learn how multiplying fractions is similar to multiplying whole numbers.



Ground Picture/Shutterstock.com

Unit Story: Finny In this story, Henry adopts a plant and learns patience as he tries, fails, and with some help, tries again to get it to grow.



Natalie Board/Shutterstock.com

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Artem Glushchenko/Shutterstock.com

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New Africa/Shutterstock.com

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Unit 4 From Hundredths to Hundred Thousands

Let's learn how place value extends to numbers less than 1 and greater than 1,000.




Bradley Olson/Shutterstock.com

Unit Story: Myles and the Leatherbacks In this story, Myles describes his experiences working with his mother at the local "Sea Turtle Patrol."



randy andy/Shutterstock.com

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ESB Professional/Shutterstock.com

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Andy Gin/Shutterstock.com

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Unit 5 Multiplicative Comparison and Measurement

Let's discover how to compare numbers or amounts using multiplication. Let's use multiplication to rewrite measurements using different units.



Natalia Ploskaya/Shutterstock.com

Unit Story: Just for Fun In this story, Lucas explores a variety of activities at the local community center.



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Unit 6 Multiplying and Dividing Multi-Digit Numbers

Let's multiply and divide multi-digit whole numbers by breaking them down into smaller parts. Let's use these skills to solve problems with multiple steps.




Nikita M production/Shutterstock.com

Unit Story: Special Day, Special Lei In this story, Maile and her family work at Pat's Lei Shop, where they make, sell, and ship Hawaiian lei for special occasions.



Curioso.Photography/Shutterstock.com

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Number1411/Shutterstock.com

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Andrii Zastrozhnov/Shutterstock.com

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Unit 7 Angles and Properties of Shapes

Let's learn to draw and identify points, lines, rays, angles, and parallel and intersecting lines. Let's classify triangles and quadrilaterals based on their sides and angles, and explore symmetry.



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Unit Story: Captain Bogwart's Treasure In this story, Kayla is on the hunt for Captain Bogwart's treasure. She will use a map and clues to help her get close!



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Kevin Kopf/Shutterstock.com

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Unit 5

Multiplicative Comparison and Measurement

Big Ideas in This Unit

- CC1 Measuring and Plotting
- Rectangle Investigations
- CC2 Factors and Area Models
- Multi-Digit Numbers
- Number and Shape Patterns
- CC3 Circles, Fractions and Decimals
- Fraction Flexibility
- CC4 Connected Problem Solving

Questions for Investigation

- What does it mean to compare numbers or amounts using multiplication?
- How can we use multiplication to rewrite a measurement using a different unit?



Explore: Designing a System of Measurement

How are the units in a measurement system related to one another?



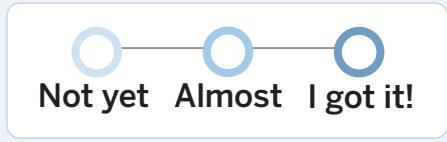
Unit Story: Just for Fun

In this story, Lucas explores a variety of activities at the local community center.



Watch Your Knowledge Grow

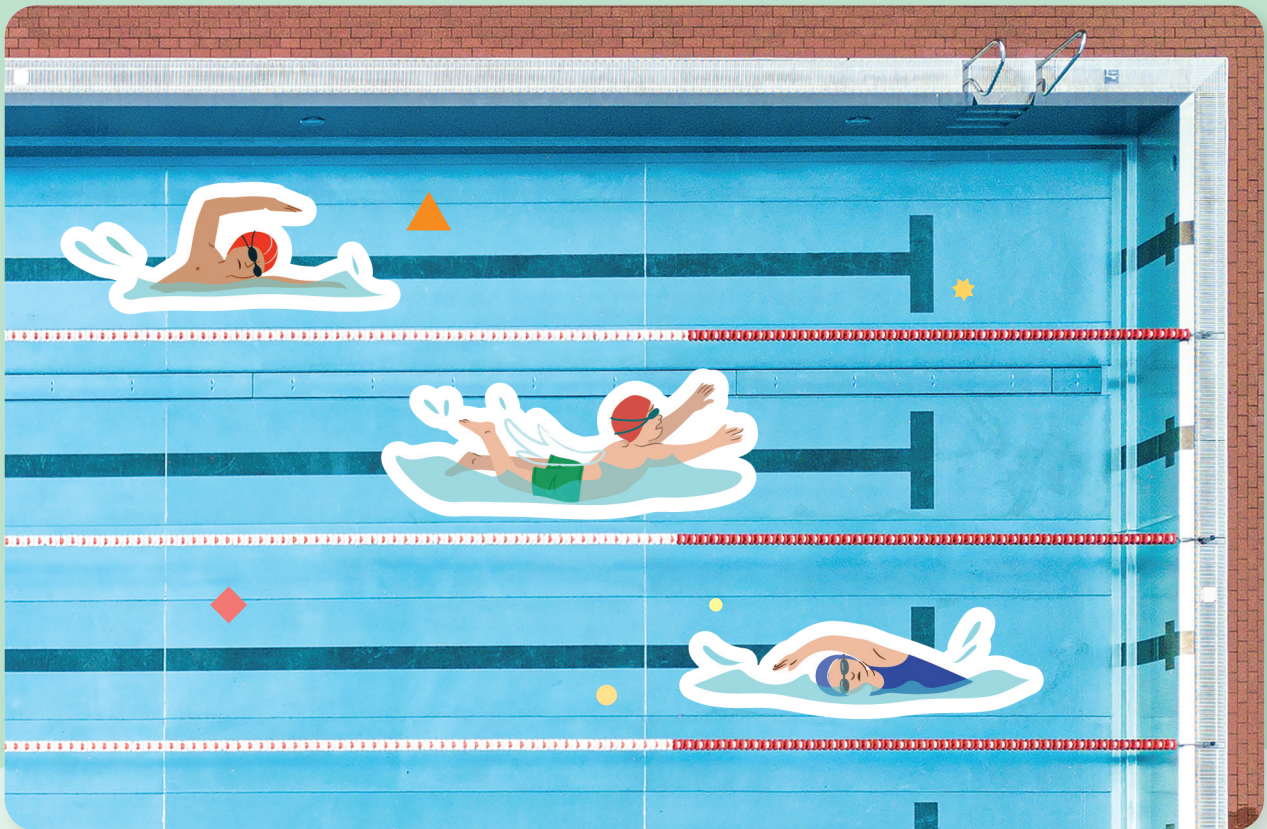
This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



I can . . .	Before	After
Use multiplication and the phrase "times as many" to compare 2 quantities.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Use a diagram, a statement, and an equation to represent a comparison relationship.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Use addition, subtraction, multiplication, and division to solve comparison story problems.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Compare and convert measurement units of length (kilometers, meters, and centimeters, as well as yards, feet, and inches).	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Compare and convert measurement units of liquid volume (liters and milliliters).	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Compare and convert measurement units of weight (kilograms and grams, as well as pounds and ounces).	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Compare and convert measurement units of time (hours, minutes, and seconds).	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Solve problems involving perimeters of rectangles.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Solve multi-step problems using operations and measurements.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>

Multiplicative Comparison

✦ Unit Story: Just for Fun



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Penny was slow when she first started swimming, but she had fun learning and got better with practice. What is something you have practiced in math class so you could get better at it?

Explore:


Designing a System of Measurement

How are the units in a measurement system related to one another?



Warm-Up



 eyes on teacher



I am a doer of math.
Why is creativity important in math class?

Discuss  What do you notice? What do you wonder?

Just for Fun

Unit Story





Work with your partner to design a measurement system with 3 units of length that are related in some way. Create a chart with the following information.

- Name of your measurement system.
- Names of the 3 units in your system.
- Description or diagram showing how the measurement units in your system are related to one another.

Ways to be a mathematician

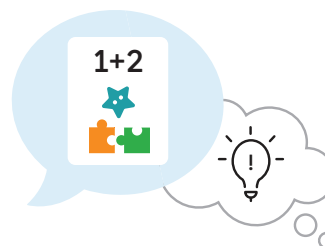
- 1** I can take my time to think about a challenging problem before trying to solve it.

○ ——— ○ ——— ○
Not yet Almost I got it!



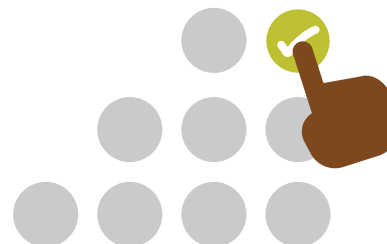
- 2** I can work carefully and try to be clear when I share my ideas.

○ ——— ○ ——— ○
Not yet Almost I got it!



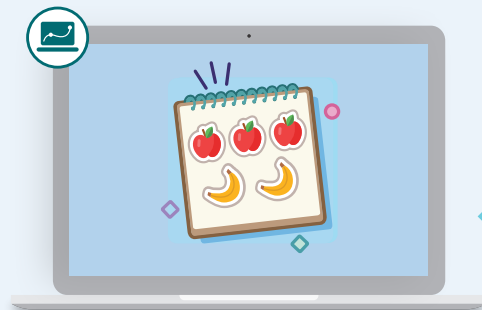
- 3** I can see how ideas are connected and use patterns to help solve problems.

○ ——— ○ ——— ○
Not yet Almost I got it!



Sticker Mania

Let's represent situations that involve *times as many*.



Warm-Up

1

eyes on teacher

I can be all of me in math class.

What are some of your strengths in math class?

Activity

1

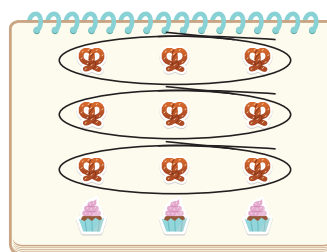
Two Ways to Compare

2

Discuss

Jada says there are 3 times as many pretzels as cupcakes. Deigo says there are 6 more pretzels than cupcakes. Who do you agree with and why?

Jada



Diego



3

Choose a method to compare the number of dogs and cats. Complete one of the sentences of your choosing.

A) There are _____ *times as many* dogs as cats.

B) There are _____ *more* dogs than cats.

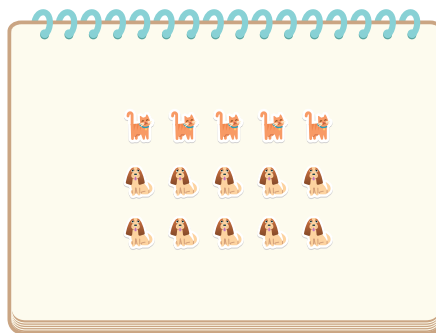


1

Two Ways to Compare (continued)

- 4** Choose a method to compare the number of dogs and cats.
Complete one of the sentences of your choosing.

- A) There are _____ *times as many* dogs as cats.
- B) There are _____ *more* dogs than cats.



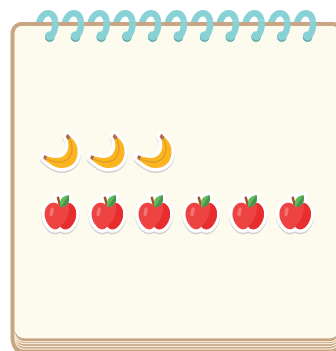
5 Discuss 

How would you compare the number of dogs to the number of cats?



- 6** Which statements are true about the stickers? Select *all* that apply.

- (A) There are 3 more apples than bananas.
- (B) There are 3 times as many apples as bananas.
- (C) There are 2 times as many apples as bananas.

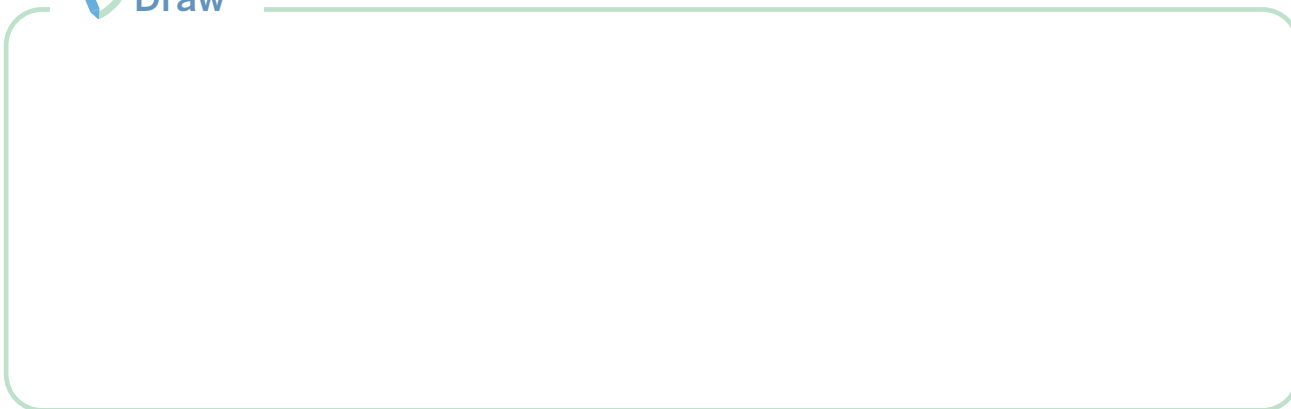


Grouping Galore

- 7** Create a drawing or diagram that represents 1 possibility for the number of soccer balls and the number of footballs.

There are 2 times as many stars as footballs.

 Draw



- 8** Discuss 

Describe your strategy for Screen 7. Are there other possible amounts of footballs and stars?

- 9** Complete the table to show *at least* 2 different possibilities for the number of hot dogs and the number of hamburgers.

There are 3 times as many hot dogs as hamburgers.

Hot dogs	Hamburgers

Grouping Galore (continued)

- 10** Complete the table to show *at least* 2 different possibilities for the number of bicycles and the number of skateboards.

There are 6 times as many bicycles as skateboards.

Bicycles	Skateboards

- 11** **Discuss** 

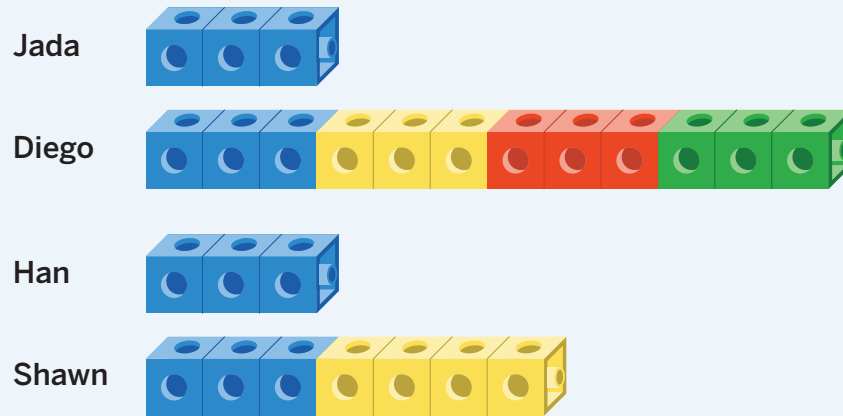
There are 6 times as many bicycles as skateboards.

How could you determine other possible quantities of bicycles and skateboards if you had unlimited stickers?



Summary 5.02

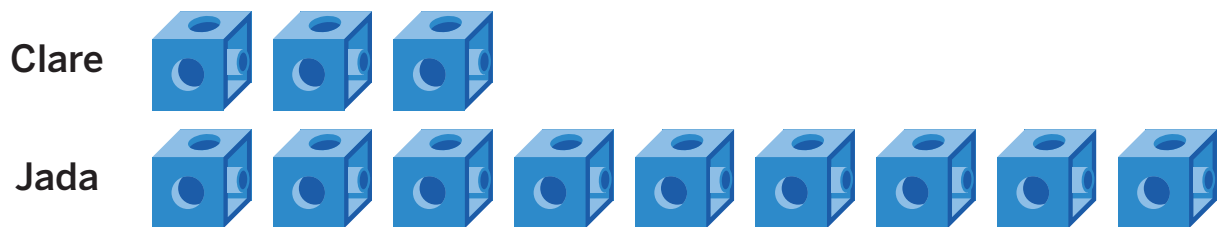
There are different ways to compare 2 quantities. One way is to compare how many times greater 1 quantity is than the other. A second way is to compare how much more 1 quantity is than the other.



Diego has 4 times as many cubes as Jada.
Shawn has 4 more cubes than Han.

Practice 5.02

- 1 Clare has 3 cubes. Jada has 9 cubes. Complete the comparison statements.



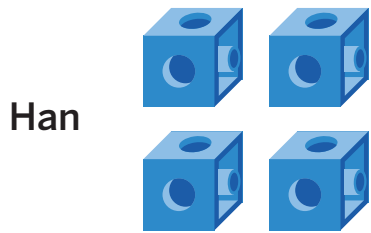
Jada has _____ *times as many* cubes as Clare.

Jada has _____ *more* cubes than Clare.

Practice 5.02

Name _____ Date _____

- 2 Han has 4 cubes. Shawn has 8 times as many cubes as Han. How many cubes does Shawn have?



 Show your thinking.

answer: _____

- 3 Priya has 5 times as many cubes as Jada. Complete the table to show 3 possibilities for the number of cubes Jada has and the number of cubes Priya has.

Jada	Priya

Practice 5.02

Name _____ Date _____

- 4  Clare has 6 cubes. Diego has 4 times as many cubes as Clare. How many cubes does Diego have?

(A) 10 cubes (B) 12 cubes (C) 18 cubes (D) 24 cubes

Spiral Review

- 5 Write $\frac{8}{5}$ as a sum of fractions in 5 different ways.

$$\frac{8}{5} = \underline{\hspace{10em}}$$

$$\frac{8}{5} = \underline{\hspace{10em}}$$

$$\frac{8}{5} = \underline{\hspace{10em}}$$

$$\frac{8}{5} = \underline{\hspace{10em}}$$

$$\frac{8}{5} = \underline{\hspace{10em}}$$

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

 Show your thinking.

6 $1,934 + 3,605$

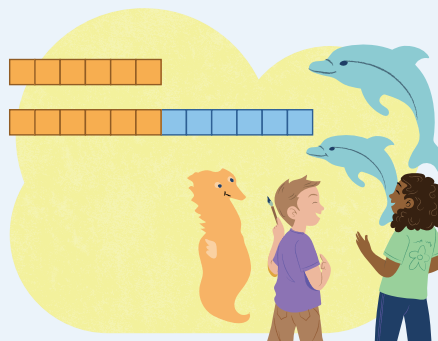
answer: _____

7 $5,625 - 3,234$

answer: _____

Representing “Times as Many”

Let’s represent situations with
“times as many” in different ways.



Warm-Up



eyes on teacher



I can be all of me in math class.

How have you grown as a mathematician this year?

Activity

1

Times as Many Towers

Hands-On

You and your partner will be given cubes.

- 1 Choose a number to complete the statement. Represent and label Tower A and Tower B so they can match your completed statement.

Draw

Tower B has _____ times as many cubes as Tower A.

1**Times as Many Towers (continued)**

- 2 Choose a new number to complete the statement. Represent and label Tower A and Tower B so they match your completed statement.

 Draw

Tower B has _____ times as many cubes as Tower A.

- 3 Write a multiplication equation to represent your comparison situation in Problem 2.

Connecting Representations of “Times as Many”

Hands-On

Use the given information to complete the missing diagram, statement, or equation. Be prepared to explain your thinking.


4 diagram:

statement: Jada has 3 cubes. Han has 2 times as many cubes as Jada.

equation: $2 \times 3 = 6$

5 diagram:

Diego 

Priya 

statement: Diego has 5 cubes. Priya has 3 times as many cubes as Diego.

equation: _____

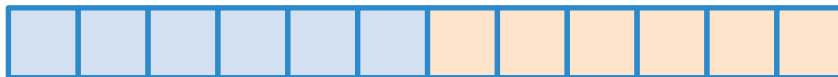
Connecting Representations of “Times as Many” (continued)

6 diagram:

Han



Shawn



statement: _____

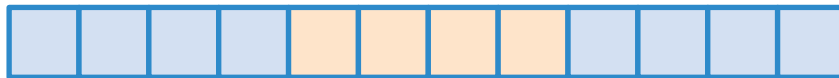
equation: $2 \times 6 = 12$

7 diagram:

Clare



Jada



statement: _____

equation: _____

Summary 5.03

In a multiplication equation representing a comparison of 2 quantities, one of the factors is the multiplier, which represents “times as many.” The other factor is the lesser quantity, and the product is the greater quantity.

$$55 = 5 \times 11$$

greater multiplier lesser
quantity quantity

$$55 = 5 \times 11$$

greater lesser multiplier
quantity quantity

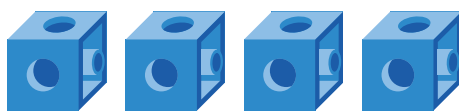
**Shawn has 11 strawberries.
Diego has 5 times as
many strawberries.**

**Shawn has 5 strawberries.
Diego has 11 times as
many strawberries.**

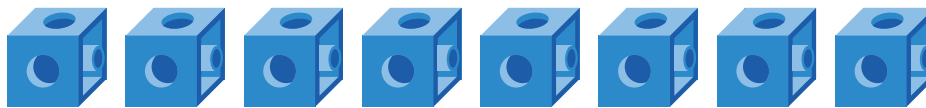
Practice 5.03

- 1 Write a statement using “times as many” that describes Priya’s and Shawn’s cubes.

Priya



Shawn



- 2  Which statement describes the cubes that Han and Jada have?

Han

Jada

- (A) Jada has 2 times as many cubes as Han.
(B) Han has 3 times as many cubes as Jada.
(C) Jada has 3 times as many cubes as Han.
(D) Han has 4 times as many cubes as Jada.
- 3 Shawn has 3 cubes. Diego has 4 times as many cubes as Shawn. Draw a diagram to represent Shawn's and Diego's cubes. How many cubes does Diego have?

 Draw

answer: _____

- 4 Priya has 8 cubes. Clare has 2 times as many cubes as Priya. Write an equation to represent the situation.

- 5 Write a statement that represents the equation $3 \times 5 = 15$.

Spiral Review

- 6 Complete the table.

Standard form	Number in words
15,809	
	seven hundred eighty thousand, three hundred fifty-five
3,001	

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

7 2×12 _____

8 9×3 _____

9 8×6 _____

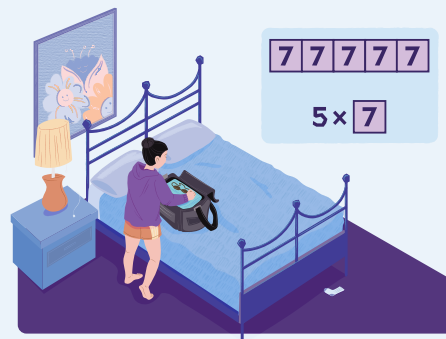
10 $36 \div 3$ _____

11 $100 \div 10$ _____

12 $24 \div 6$ _____

Going Swimming

Let's solve comparison story problems.



Warm-Up



eyes on teacher

We are a math community.
How has the community in math class helped you as a mathematician?

Activity

1

Swim Groups

At the community center, there are different swim groups named after sea animals.

- Write an equation with a ? to represent the unknown value and then solve the story problem. Use the tape diagram to help you.

The starfish group has 3 kids. The crab group has 4 times as many kids as the starfish group. How many kids does the crab group have?

equation: _____

diagram: starfish group

3

 crab group

3	3	3	3
---	---	---	---

answer: _____

1**Swim Groups (continued)**

Write an equation with a ? to represent the unknown value, draw a tape diagram to represent the story problem, and then solve the story problem.

i Show your thinking.

- 2** The shark group has 8 kids. The manta group has 6 times as many kids as the shark group. How many kids does the manta group have?

equation: _____

diagram:

answer: _____

- 3** The jellyfish group has 7 kids. The dolphin group has 6 times as many kids as the jellyfish group. How many kids does the dolphin group have?

equation: _____

diagram:

answer: _____

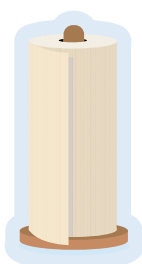
What Remains the Same?

Use the tape diagram to help you complete the table.



4 For each value of A , determine the value of B .

Value of A	Value of B
14	
140	
10	
85	
160	
1,000	

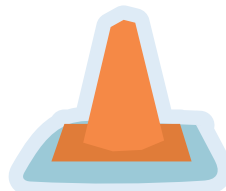


What Remains the Same? (continued)

- 5 Choose a row from the table and write a multiplication equation to represent the relationship between the value of A and the value of B .

6 **Discuss** 

- What do you notice about the values of A and B ?
- How did you determine the value of B for each row?
- How can the same diagram represent so many different pairs of numbers?



Summary 5.04

A comparison relationship can be represented using a tape diagram, a statement, and an equation. The same tape diagram can be used to represent any pair of numbers that are related by the same multiplier.

Diego 

Han 

Diego has 5 oranges. Han has 8 times as many.
 $5 \times 8 = 40$

Diego has 7 oranges. Han has 8 times as many.
 $7 \times 8 = 56$

Practice 5.04

- 1 Draw a diagram to represent the story problem. Write an equation with a ? to represent the unknown value and then solve the story problem.

story problem: A brown rat has 16 teeth. A giraffe has twice as many teeth as a brown rat. How many teeth does a giraffe have?

diagram:

equation: _____

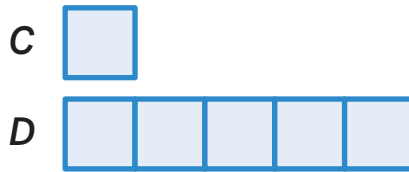
answer: _____

- 2 Write an equation to represent the story problem and then solve the story problem.

A van seats 8 passengers. A bus seats 9 times as many passengers as the van. How many passengers can be seated on the bus?

equation: _____ answer: _____

Use the tape diagram to complete Problems 3 and 4.



- 3 For each value of C , determine the value of D .

Value of C	Value of D
5	
10	
50	
100	

- 4  Which equations could represent the relationship between the value of C and the value of D ? Select *all* that apply.

- A. $5 \times 50 = 250$ B. $10 \times 50 = 500$
- C. $5 + 5 = 25$ D. $5 + 20 = 25$
- E. $100 \times 5 = 500$ F. $5 \times 5 = 25$

Practice 5.04

Name _____ Date _____

- 5 Write an equation to represent the story problem and then solve the story problem.

Shawn has 12 blueberries. Clare has 3 times as many blueberries as Shawn. How many blueberries does Clare have?

equation: _____ answer: _____

Spiral Review

- 6 Determine whether each equation is *true* or *false*. Place a check mark in the correct column.

	True	False
$\frac{4}{100} + \frac{3}{10} = \frac{43}{100}$		
$\frac{6}{10} + \frac{16}{100} = \frac{66}{100}$		
$\frac{5}{100} + \frac{8}{10} = \frac{85}{100}$		

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

 Show your thinking.

7 $6,082 + 2,096$

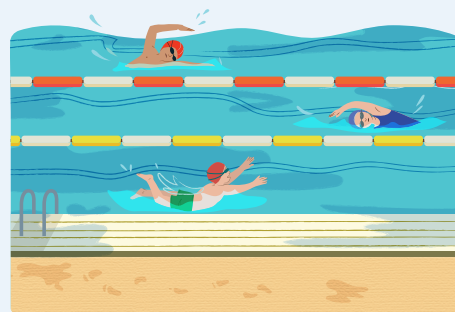
answer: _____

8 $9,385 - 7,048$

answer: _____

Swimming Laps

Let's represent and solve comparison story problems with larger numbers.



Warm-Up



eyes on teacher

I can be all of me in math class.

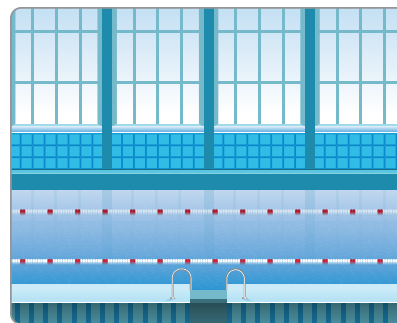
How do your actions in math class show that you are a mathematician?

Activity

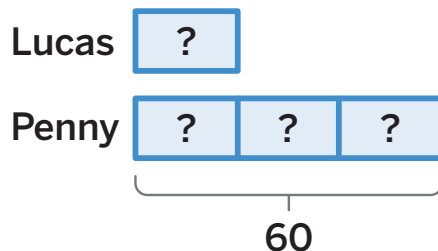
1

How Many Meters?

Lucas goes to the community center with Penny to swim 3 days a week. They count the meters they swim using lane markers along the pool that mark each meter.



Look at the diagram. Lucas swam some meters. Penny swam 60 meters altogether.



1 How many times as many meters did Penny swim than Lucas?

1

How Many Meters? (continued)

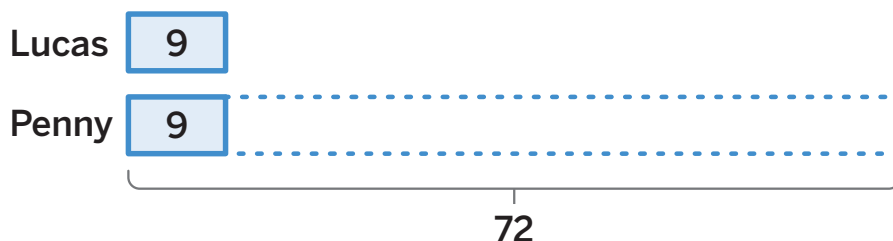
- 2 Write a multiplication equation to compare the meters Penny and Lucas swam. Use a ? to represent the unknown value.

- 3 How many meters did Lucas swim?

 Show your thinking.

answer: _____

Look at the diagram. Penny swam 72 meters. Lucas swam 9 meters.



- 4 Write a multiplication equation to compare the meters Lucas and Penny swam. Use a symbol to represent the unknown value.

- 5 How many times as many meters did Penny swim than Lucas?

- 6 Share your multiplication equation from Problem 4 with your partner.
- How are they similar? How are they different?
 - How does your equation represent the story problem?
 - How does your equation represent the diagram?

2

How Many Laps?

Write 1 multiplication equation and 1 division equation to represent each story problem. Use a symbol to represent the unknown value in each equation.

Solve each story problem to determine the unknown value.

 Show your thinking.

- 7 Lucas swam 13 laps and Penny swam 130 laps. How many times as many laps did Penny swim compared to the number of laps Lucas swam?

multiplication equation: _____

division equation: _____

answer: _____

How Many Laps? (continued)

i Show your thinking.

- 8** Lucas swam some laps. Penny swam 72 laps, which is 12 times as many laps as Lucas swam. How many laps did Lucas swim?

multiplication equation: _____

division equation: _____

answer: _____

- 9** Penny swam 8 times as many laps as Lucas. Lucas swam 7 laps. How many laps did Penny swim?

multiplication equation: _____

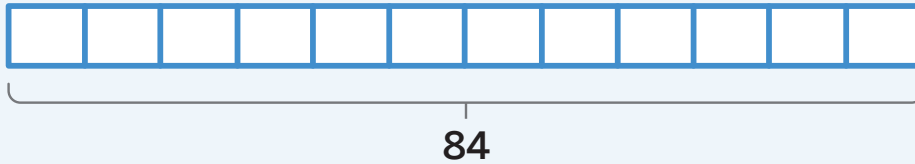
division equation: _____

answer: _____

Summary 5.05

Multiplication and division are related operations that can be used to solve some types of comparison story problems.

$$\underline{\quad} \times 12 = 84$$



$$84 \div 12 = ?$$

Practice 5.05

Use the story problem for Problems 1–3. Priya practiced the clarinet 6 times as many minutes as Jada. Jada practiced for 15 minutes. How many minutes did Priya practice?

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

- 2 Write 1 division equation to represent the story problem. Use a ? to represent the unknown value.

- 3 Solve the story problem to determine the unknown value.

 Show your thinking.

answer: _____

Use the information for Problems 4 and 5. Diego practiced the violin for 48 minutes. Shawn practiced the violin for 12 minutes.

- 4 Draw a diagram to compare the minutes Diego and Shawn practiced the violin.

 Draw

- 5 Write a statement using “times as many” to compare the minutes Diego practiced to the minutes Shawn practiced.

Use the information for Problems 6–8. Han practiced the piano for 75 minutes, which is 5 times as many minutes as Clare practiced.


- 6 Write 1 multiplication equation to show the comparison. Use a ? for the unknown value.

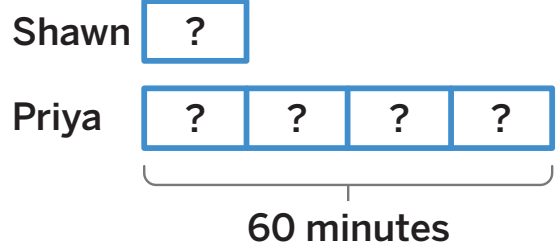
- 7 Write 1 division equation to show the comparison. Use a ? for the unknown value.

- 8 How long did Clare practice the piano?

Practice 5.05

Name _____ Date _____

- 9  Shawn and Priya practiced the trumpet. Priya practiced for 60 minutes. Select *all* the equations that represent the situation.



- A. $4 \times ? = 60$ B. $? \div 4 = 60$
 C. $60 \times 4 = ?$ D. $60 \div 4 = ?$

Spiral Review

For Problems 10–13, determine the value that makes the equation true.

10 _____ $+$ $\frac{1}{10} = \frac{9}{10}$ 11 $\frac{7}{10} -$ _____ $= \frac{5}{10}$

12 $\frac{3}{10} +$ _____ $= \frac{9}{10}$ 13 _____ $- \frac{4}{10} = \frac{9}{10}$

For Problems 14–19, determine the value of the expression.

14 9×8 _____ 15 4×10 _____

16 5×7 _____ 17 $21 \div 3$ _____

18 $54 \div 9$ _____ 19 $55 \div 5$ _____

Swim Club Equipment

Let's solve comparison story problems.



Warm-Up



eyes on teacher



I can be all of me in math class.

How have you shared your mathematical ideas in math class?

Activity

1

New Equipment

Each year, the community center buys new equipment for the swim club. This year, 16 kickboards were ordered, and the number of swim caps ordered was 6 times the number of kickboards ordered.

- How many more swim caps than kickboards were ordered this year?



Show your thinking.

answer: _____

equation(s): _____

1**New Equipment (continued)**

- 2 Last year, the community center bought 4 times as many kickboards as they bought this year. How many kickboards were bought last year and this year combined?

 Show your thinking.

answer: _____

equation(s): _____

3 **Discuss** 

Meet with another pair and compare your equations for Problems 1 and 2.

- What is similar about your equations? What is different?
- How does each equation represent each story problem?
- What operation did you choose and why?

2

How Much Did They Spend?

The community center also bought some new towels, swim goggles, pool noodles, and flippers.

- 4 The community center spent \$104 on new towels. The total amount spent on towels was 8 times as much as the cost of 1 pair of swim goggles. If 9 pairs of swim goggles were ordered, how much was spent on swim goggles?



Show your thinking.

answer: _____

How Much Did They Spend? (continued)

- 5 The total amount spent on pool noodles was 14 times as much as the amount spent on 1 pair of flippers. \$98 was spent on pool noodles. The community center bought 8 pairs of flippers. How much was spent on flippers?

**Show your thinking.**

answer: _____

- 6 **Discuss**

Are your answers for Problems 4 and 5 reasonable? How do you know?

Summary 5.06

Two-step story problems that involve comparison may require the use of addition, subtraction, multiplication, or division to determine the missing values and can be represented with 1 or 2 equations.

At a book fair, the school collected \$10 on Monday morning. That afternoon, the school collected 8 times as much as they did in the morning. How much money did they collect altogether?

$$10 \times 8 = 80$$

$$(10 \times 8) + 10 = 90$$

$$80 + 10 = 90$$

They collected \$90 altogether.

Practice 5.06

- 1 Diego donated 54 canned goods to a food drive. Diego donated 6 times as many canned goods as Priya. How many canned goods did Diego and Priya donate altogether?

 Show your thinking.

answer: _____

Use the information for Problems 2–5. Jada biked 88 miles last month. This is 4 times as many miles as Shawn biked.

- 2 Draw a diagram to represent the situation.

 Draw

- 3 Shawn says, “To determine how many miles I biked, I can use multiplication.” Write an equation to represent Shawn’s thinking.

- 4 Jada says, “To determine how many miles Shawn biked, I can use division.” Write an equation to represent Jada’s thinking.


- 5 Determine how many miles Shawn and Jada biked altogether.

 Show your thinking.

answer: _____

Practice 5.06

Name _____ Date _____

- 6  The school librarian ordered 12 comic magazines. He ordered 8 times as many graphic novels. How many more graphic novels than comic magazines did the librarian order?

(A) 20 (B) 84 (C) 96 (D) 120

 Show your thinking.

Spiral Review

For Problems 7 and 8, write the number in expanded form.

7 701,925

8 453,280

For Problems 9–14, determine the value of the expression.

9 $36 \div 3$ _____

10 $81 \div 9$ _____

11 7×4 _____

12 5×3 _____

13 $18 \div 2$ _____

14 2×11 _____

Create Your Own Problem

Let's write and solve two-step story problems.



Warm-Up



eyes on teacher



I am a doer of math.

What connections did you make in math class today?

Activity

1

More Swimming Problems

You will write a two-step comparison story problem using ideas from the Unit Story. In your problem, use *at least 2 nouns* and *1 verb* from the word banks, and you must use the phrase “times as many.”

Nouns

Lucas	Penny	swim goggles	kickboards	pull buoys	towels
starfish group	crab group	shark group	manta group	jellyfish group	dolphin group
swim caps	flippers	lap	meter	community center	

Verbs

swim	buy	practice	purchase	order	use
------	-----	----------	----------	-------	-----

1

More Swimming Problems (continued)

1 Write a two-step story problem involving comparison.

2 Solve your story problem. Use equations to represent the steps.

 **Show your thinking.**

answer: _____

Summary 5.07

When comparing different quantities, using “times as many” language indicates a comparison that involves multiplication.

Jada has 4 times as many cubes as Han.

Han

3

Jada

3	3	3	3
---	---	---	---

$$4 \times 3 = 12$$

Practice 5.07

- 1 Shawn donated 72 books to a book drive. This was 9 times as many books as Han donated. How many more books did Shawn donate than Han?

 Show your thinking.

answer: _____

Use the information for Problems 2–4.

At this year's school carnival, the ring toss earned \$24. The cakewalk earned 4 times as much money as the ring toss.

Last year, the ring toss earned 3 times as much money as it did this year, and the cakewalk earned 2 times as much money as it did this year.

2 How much money did the cakewalk earn this year?



Show your thinking.

answer: _____

3 Which expression could be used to determine how much money the ring toss earned last year?



A 24×2



B 24×3



C 24×4



D 24×6

4 How much more money did the ring toss earn last year than this year?



Show your thinking.

answer: _____

Practice 5.07

Name _____ Date _____

- 5 On Saturday, Clare found 8 species of insects while hiking. On Sunday, she found 4 times as many species of insects. How many species of insects did Clare find on Saturday and Sunday combined?

 Show your thinking.

answer: _____

Spiral Review

- 6 Complete the table with equivalent fractions in tenths or hundredths.

Tenths	Hundredths
$\frac{1}{10}$	
	$\frac{90}{100}$

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

 Show your thinking.

7 $5,729 + 8,537$

answer: _____

8 $8,537 - 5,729$

answer: _____



Notes:

Converting Length Measurements

✦ Unit Story: Just for Fun

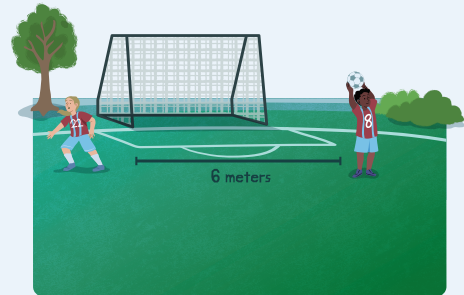


brizmaker/Shutterstock.com

Lucas and Ziggy had to use math to measure and chop ingredients to make vegetarian chili. How have you used math at home?

How Long Is a Meter?

Let's explore lengths in meters and centimeters.



Warm-Up



eyes on teacher

I can be all of me in math class.

How have you used mistakes in math class to grow as a mathematician?

Activity

1

How Long Is 1 Meter?

Hands-On

Your group will be given centimeter grid paper, scissors, and tape to create a strip that is 100 centimeters long.

Meters and centimeters are units of length in the metric system. A length of 100 centimeters (cm) is the same as the length of 1 meter (m).

1 Discuss

- How will you organize and count the centimeter squares?
- How can you make sure you include 100 centimeter squares without counting them all?

1

How Long Is 1 Meter? (continued)

- 2 Find 6 or 7 rectangular items in the classroom that you think have a length or width of about 1 meter. List the items you found.

- 3 Use your paper strip to determine which of your items has the closest length or width to 1 meter.



Around the Community Center

Lucas measured some items around the community center in meters and recorded the measurements in the table. He wants to convert each measurement to centimeters without measuring each item again.

- 4 Complete the table using what you know about the relationship between meters and centimeters.

Item	Measurement in meters (m)	Measurement in centimeters (cm)
length of a baseball bat	1	100
height of a basketball hoop	3	
length of a children's soccer goal	5	
length of a basketball bleacher	25	
length of the swimming pool	50	
length of the sprinting track	100	

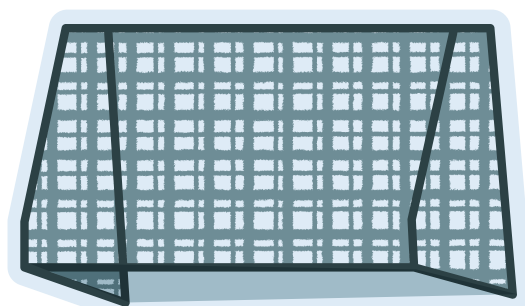


Around the Community Center (continued)

5 How did you determine the length of the swimming pool in centimeters?

i Show or explain your thinking.

6 Make a conjecture. How can you determine the measurement in centimeters for any given measurement in meters?



Summary 5.08

Meters (m) and centimeters (cm) are units of length in the metric system. 1 meter is equivalent to 100 centimeters, so you can multiply any length in meters by 100 to determine the equivalent length in centimeters.

$$1 \text{ meter} = 100 \text{ centimeters}$$

$$2 \text{ meters} = \underline{\quad} \text{ centimeters} \quad 10 \text{ meters} = \underline{\quad} \text{ centimeters}$$

$$2 \times 100 = 200$$

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

$$2 \text{ meters} = 200 \text{ centimeters} \quad 10 \text{ meters} = 1,000 \text{ centimeters}$$

Practice 5.08

- 1 Which is longer — 50 centimeters or 1 meter? Explain your thinking.

- 2 Which is longer — 3,000 centimeters or 3 meters? Explain your thinking.

- 3  What unknown number makes the equation true?

$$200 \text{ meters} = \square \text{ centimeters}$$

- (A) 20 (B) 200
(C) 20,000 (D) 2,000

- 4 The Great Pyramid in Egypt now measures 137 meters tall. What is the height of the Great Pyramid in centimeters?

- 5 The table shows the heights of several modern structures throughout the world in meters. Convert the length of each measurement to centimeters.

Structure	Measurement in meters (m)	Measurement in centimeters (cm)
Thunder Mountain at Disneyland	15	
Leaning Tower of Pisa	55	
Big Ben	98	
Statue of Liberty	93	
Space Needle	184	
Eiffel Tower	330	

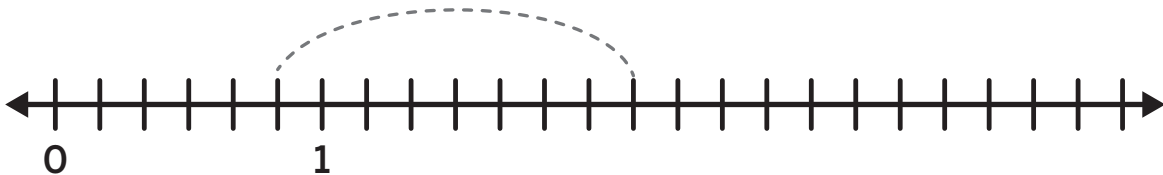
Practice 5.08

Name _____ Date _____

- 6 The largest leaf ever found was an oak leaf that measured 41 centimeters. Is that leaf *shorter* or *longer* than 1 meter? Explain your thinking.

Spiral Review

- 7 Write 1 addition equation and 1 subtraction equation that represent the number line.



addition equation: _____

subtraction equation: _____

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

8 $25 \div 5$ _____

9 $49 \div 7$ _____

10 9×6 _____

11 4×6 _____

12 $14 \div 2$ _____

13 8×6 _____

How Long Is a Kilometer?

Let's explore measurements in meters and kilometers.



Warm-Up



eyes on teacher



I can be all of me in math class.
What new things have you tried in math class to grow as a mathematician?

Activity

1

How Long Is 1 Kilometer?

Meters and kilometers are units of length in the metric system. There are 1,000 meters in 1 kilometer (km).

Here are some locations and objects found around the community center. One length is labeled for each location or object.

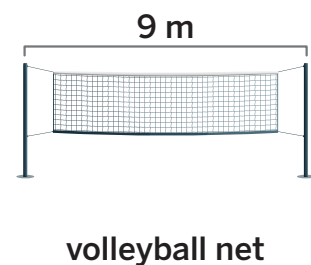
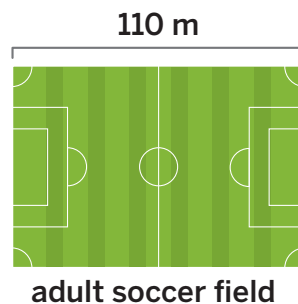
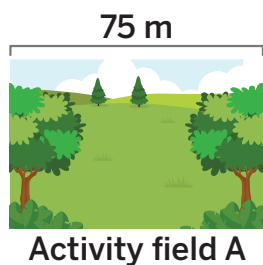
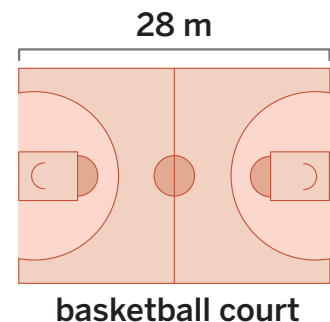
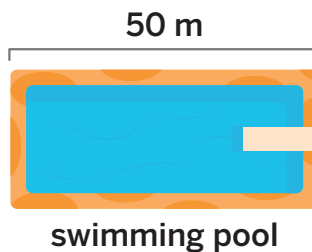
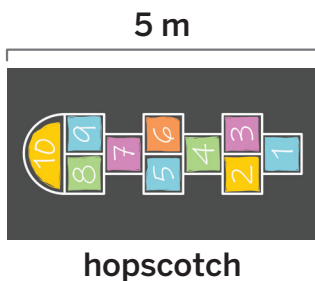


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1**How Long Is 1 Meter? (continued)**

Use the measurements of the different locations and objects found around the community center to complete the statements.

1 kilometer is the length of *about* . . .

1 _____ hopscotch games.

2 _____ pools.

3 _____ basketball courts.

4 _____ of Activity field A.

5 _____ adult soccer fields.

6 _____ volleyball nets.



2

Meters and Kilometers

- 7 Complete the table by converting the lengths in kilometers to meters. Show or explain your thinking.

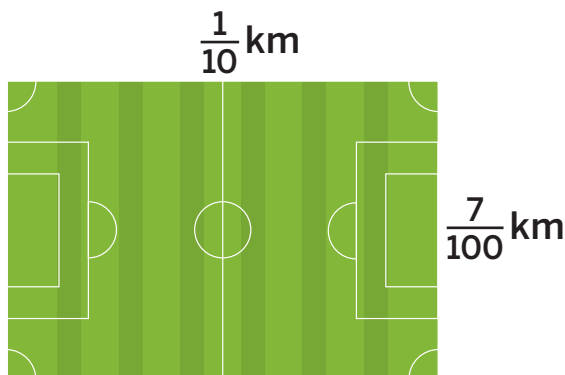
Kilometers (km)	Meters (m)	My thinking
1		
5		
10		
27		
$\frac{1}{2}$		
$5\frac{1}{2}$		

Meters and Kilometers (continued)

- 8 Make a conjecture. How can you determine the length in meters for any given length in kilometers? Use the table in Problem 7 to help you.

- 9 **Discuss** 

Explain to your partner how you can use your conjecture to determine the perimeter of the soccer field in meters?



Summary 5.09

Kilometers (km) are units of length in the metric system. 1 kilometer is equivalent to 1,000 meters, so you can multiply any length in kilometers by 1,000 to determine the equivalent length in meters.

$$1 \text{ kilometer} = 1,000 \text{ meters}$$

$$2 \text{ kilometers} = \underline{\hspace{2cm}} \text{ meters}$$

$$7 \text{ kilometers} = \underline{\hspace{2cm}} \text{ meters}$$

$$2 \times 1,000 = 2,000$$

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

$$2 \text{ kilometers} = 2,000 \text{ meters} \quad 7 \text{ kilometers} = 7,000 \text{ meters}$$

kilometer A metric unit of length equal to 1,000 meters.

Practice 5.09

For Problems 1–5, use mental math to determine the value of the expression.

1 5×100 _____

2 $5 \times 1,000$ _____

3 12×100 _____

4 $12 \times 1,000$ _____

5 $20 \times 1,000$ _____

6 Clare bikes for 9 kilometers. How many meters did Clare bike?


- 7 Complete the table with the missing lengths in meters.

Kilometers (km)	Meters (m)
$2\frac{1}{2}$	
1	
4	
15	
18	
$10\frac{1}{2}$	

- 8 Diego says 1,000 meters is longer than 10 kilometers. Do you agree or disagree with Diego? Explain your thinking.

- 9  How many meters are in 6 kilometers?

- (A) 60 meters (B) 600 meters
(C) 6,000 meters (D) 60,000 meters

- 10  How many meters are in 11 kilometers?
- (A) 1,100 meters (B) 11,000 meters
- (C) 110 meters (D) 110,000 meters

Spiral Review

- 11 Grizzly Peak in Colorado has a height of 13,995 feet. Mount Humphreys in California has a height of 13,992 feet. Complete the comparison statement using $<$, $>$, or $=$.

13,995 _____ 13,992

For Problems 12 and 13, determine the value of the expression using the standard algorithm.

 Show your thinking.

12 $4,099 + 6,099$

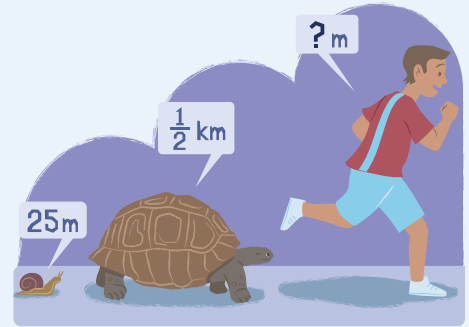
answer: _____

13 $7,004 - 3,782$

answer: _____

How Far Do They Go?

Let's compare distances given in different units.



Warm-Up



eyes on teacher



We are a math community.

What new ideas have you learned from other people in math class?

Activity

1

Card Sort: Ordering Distances

Hands-On

You and your partner will be given a set of cards. Each card names an animal and the distance it can travel in 1 day. Use the cards to complete Problems 1 and 2.

- Order the animals by the distance they can travel in 1 day from *shortest* to *longest*.



Show or explain your thinking.

shortest

longest

1

How Far Do They Go? (continued)

2 Discuss 

- Which distances did you compare and order first? Why?
- How did you compare and order the distances that were not given in the same unit? Will that strategy always work?

3 Lucas checked his fitness tracker in the morning and it recorded that he walked $\frac{60}{100}$ km. He checked it again in the evening and it recorded that he walked an additional $1\frac{9}{10}$ km.

- Where would Lucas's total distance walked fit among the order of the animals you determined in Problem 1?
- How can you use the phrase *times as far* to compare the distance Lucas walked to the distance traveled by one of the animals?

 Show your thinking.

Lucas walked more than the _____ but less than the _____.

Lucas walked _____ times as far as the _____.

Summary 5.10

You can compare distances in different units by using reasoning or converting the distances to the same unit.

Order the distances from shortest to longest.

9 km

9,500 m

90 cm

$$9 \times 1,000 = 9,000$$

$$9 \text{ km} = 9,000 \text{ m}$$

$$9 \text{ km} < 9,500 \text{ m}$$

There are 100 cm in 1 m,
so $90 \text{ cm} < 9,000 \text{ m}$.

shortest to longest: 90 cm, 9 km, 9,500 m

Practice 5.10

For Problems 1–5, complete the comparison statement using $<$, $>$, or $=$.

1 15 meters _____ 150 centimeters

2 1 kilometer _____ 10,000 meters

3 $2\frac{1}{2}$ meters _____ 300 centimeters

4 5,000 meters _____ 5 kilometers

5 16,000 centimeters _____ 16 meters

Practice 5.10

Name _____ Date _____

For Problems 6 and 7, order the distances from *shortest* to *longest*.

- 6** 2 kilometers 8,000 meters 30,000 centimeters

 Show your thinking.

shortest _____ _____ **longest**

- 7** 500 centimeters $\frac{1}{2}$ kilometers 4 meters

 Show your thinking.

shortest _____ _____ **longest**

Practice 5.10

Name _____ Date _____

- 8  Determine if each comparison statement is true or false. Select True or False for each comparison statement.

	True	False
5 meters = 500 centimeters		
15,000 centimeters < 200 meters		
350 meters < $3\frac{1}{2}$ kilometers		
18,000 meters > 10 kilometers		
1 kilometer > 2,000 meters		

Spiral Review

- 9 Determine the value that makes the equation true.

$$\frac{2}{10} + \underline{\hspace{2cm}} = \frac{28}{100}$$

 Show your thinking.

answer: _____

For Problems 10–15, determine the value of the expression.

10 $100 \div 10$ _____

11 2×11 _____

12 $63 \div 7$ _____

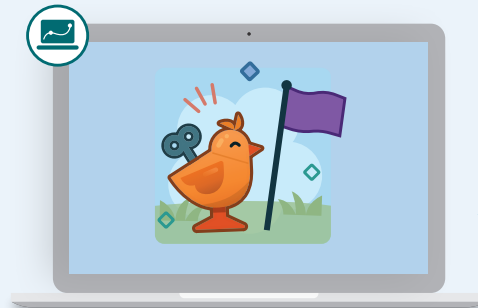
13 10×9 _____

14 $55 \div 11$ _____

15 5×12 _____

Wind-Up Toys

Let's use measurements in yards, feet, and inches.



Warm-Up

1

eyes on teacher

I can be all of me in math class.

How can you make sure your ideas are heard in math class?

Activity

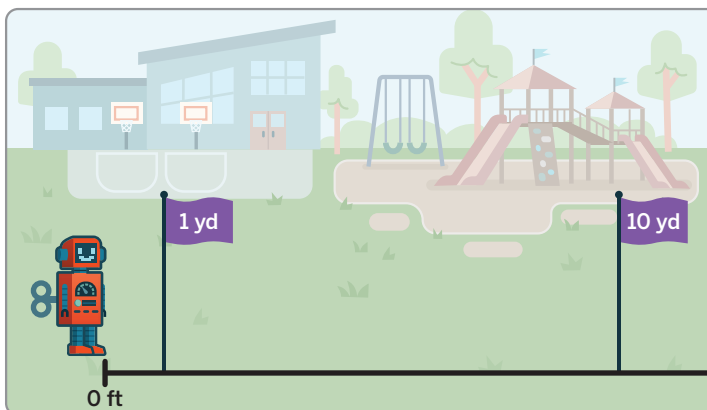
1

Yards to Feet

2

Think-Pair-Share

Each step Romeo takes is equal to 1 foot. How many feet does Romeo need to walk to reach the target?



1 yard = 3 feet

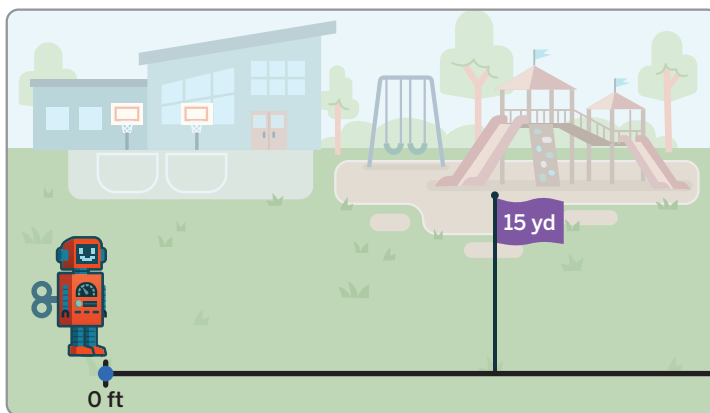
10 yards = _____ feet

1

Yards to Feet (continued)

3 How many feet does Romeo need to walk to reach the flag at 15 yards?

1 yard = 3 feet

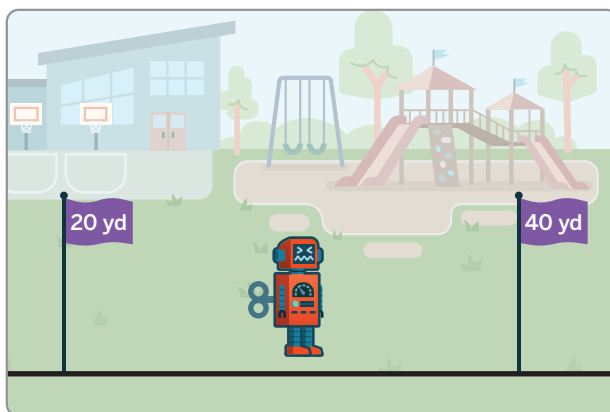


i Show or explain your thinking.

answer: _____

4 Discuss

Romeo started at 0 and broke down between the 2 flags at 20 yards and 40 yards. What is a reasonable number of feet that Romeo walked?

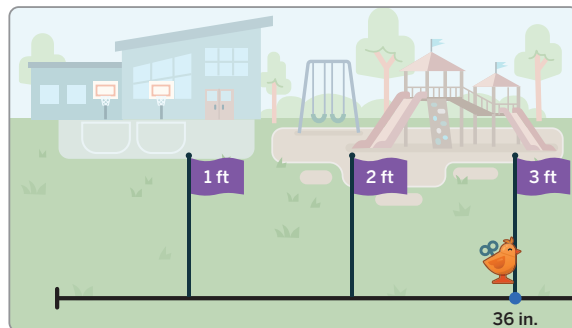
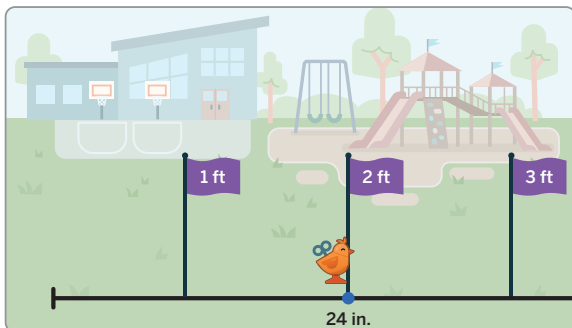


Comparing Distances

5

Discuss 

Meet Chiquita the Chick! What do you notice? What do you wonder?

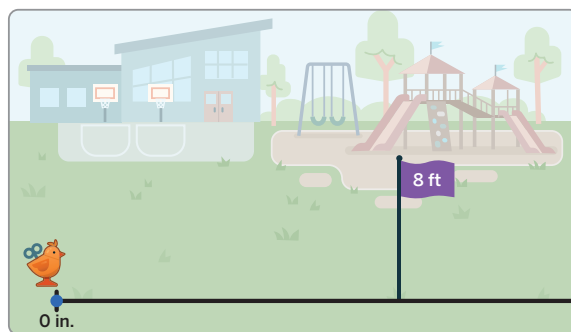


6

Complete as many challenges as you have time for. Use the information: 1 foot = 12 inches.

A

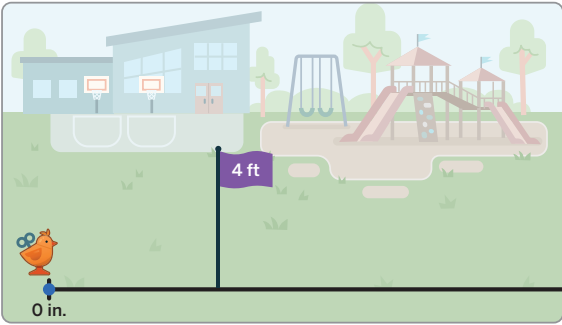
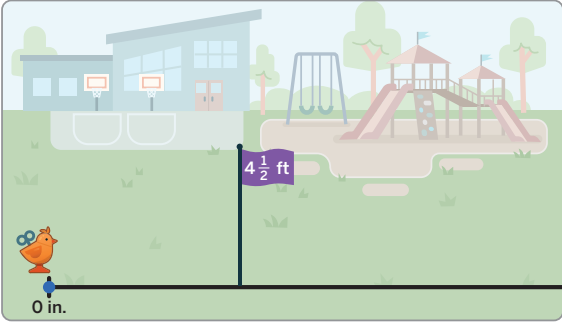
How many inches does Chiquita need to walk to reach the flag at 8 feet?



answer: _____

Comparing Distances (continued)

- 6** Complete as many challenges as you have time for. Use the information: 1 foot = 12 inches.

B	<p>How many inches does Chiquita need to walk to reach the flag at 4 feet?</p> <p>answer: _____</p>	
C	<p>How many inches does Chiquita need to walk to reach the flag at $4\frac{1}{2}$ feet?</p> <p>answer: _____</p>	

7

Discuss 

Romeo walked 20 feet. Chiquita walked 250 inches. Which toy walked farther? How do you know?

Summary 5.11

Inches (in.), feet (ft), and **yards** (yd) are U.S. Customary units of length. You can convert from one unit to another using the relationship between the units.

$$1 \text{ yard} = 3 \text{ feet}$$

$$1 \text{ foot} = 12 \text{ inches}$$

$$2 \text{ yards} = \underline{\quad} \text{ feet}$$

$$6 \text{ feet} = \underline{\quad} \text{ inches}$$

$$2 \times 3 = 6$$

$$6 \times 12 = 72$$

$$2 \text{ yards} = 6 \text{ feet}$$

$$6 \text{ feet} = 72 \text{ inches}$$

yard A unit of linear measurement equal to 3 feet.

Practice 5.11

- 1 The height of the Mona Lisa, a painting by Leonardo da Vinci, is $2\frac{1}{2}$ feet tall. How tall is the Mona Lisa in inches?

- 2 A reticulated python, the world's longest snake, can grow to be 10 yards long. What is the length of the reticulated python in feet?

 Show your thinking.

answer: _____

Practice 5.11

Name _____ Date _____


- 3 Shawn threw a softball 8 yards. Diego threw a softball 21 feet. Who threw the softball farther?

i Show your thinking.

answer: _____

- 4 Complete the table with the missing lengths in inches, feet, or yards.

Inches (in.)	Feet (ft)	Yards (yd)
		$2\frac{2}{3}$
144		4
	1	$\frac{1}{3}$
120		$3\frac{1}{3}$
		10

- 5  A soccer ball went 8 yards. Which expression could be used to determine how far the soccer ball went in feet?

(A) 8×3

(B) $8 \div 3$

(C) 8×12

(D) $8 \div 12$

Spiral Review

- 6 Clare has a bottle with 8 cups of milk in it. She pours out $3\frac{7}{8}$ cups. How many cups of milk are left in the bottle?

(A) $3\frac{1}{8}$ cups

(B) $4\frac{1}{8}$ cups

(C) $4\frac{7}{8}$ cups

(D) $5\frac{1}{8}$ cups

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

 Show your thinking.

7 $9,789 + 4,351$

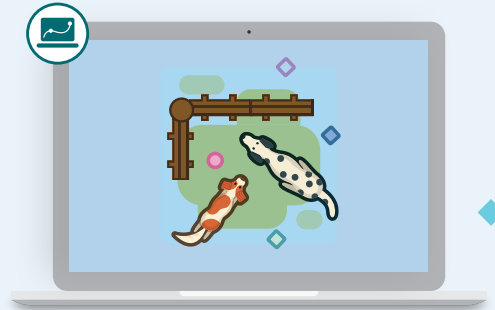
8 $8,407 - 2,388$

answer: _____

answer: _____

Paw-some Dog Parks

Let's solve problems about perimeter.



Warm-Up

1-2

eyes on teacher

I am a doer of math.

How have you persevered in math class this year?

Activity

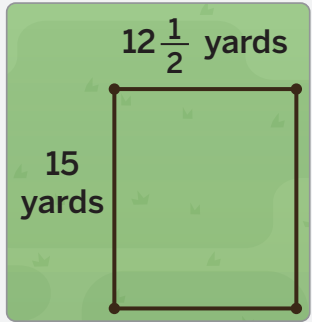
1

Don't Let the Dogs Out

3 Determine how many yards of fencing you need to build each dog park.

	Length	Width	Perimeter
	15 yards	10 yards	_____ yards
	25 yards	20 yards	_____ yards

Don't Let the Dogs Out (continued)

	Length	Width	Perimeter
	$12\frac{1}{2}$ yards	15 yards	_____ yards

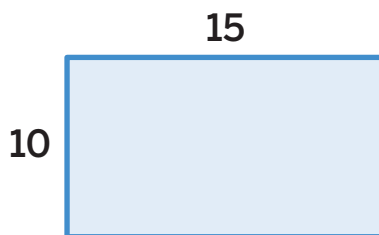
Discuss 

Explain how you determined the perimeter.

4

Discuss 

What is similar about these strategies for determining the perimeter?
What is different?



Han

$$15 + 10 + 15 + 10$$

$$\ell + w + \ell + w$$

Jada

$$(2 \times 10) + (2 \times 15)$$

$$(2 \times w) + (2 \times \ell)$$

Clare

$$2 \times (15 + 10)$$

$$2 \times (\ell + w)$$

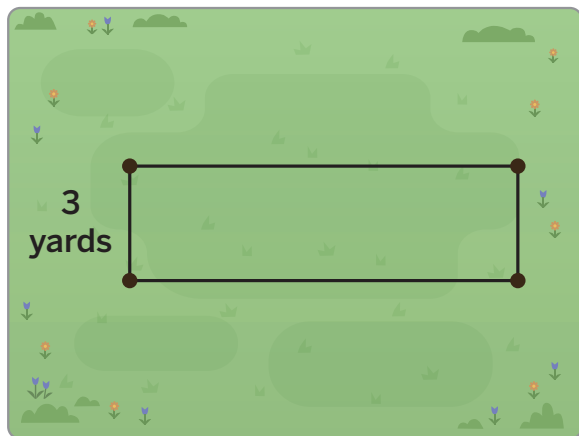
Fence It In

- 5** Determine the missing length of the fence when the perimeter is 40 yards and the width is 8 yards.

	Length	Width	Perimeter
	_____ yards	8 yards	40 yards

- 6** Determine the perimeter of the fence given the length is 4 times the width.

 Show your thinking.



answer: _____ yards

Fence It In (continued)

7 Draw and label a rectangle with a perimeter of 24 yards.



Show your thinking.

8 Write an equation representing the perimeter of your rectangle.

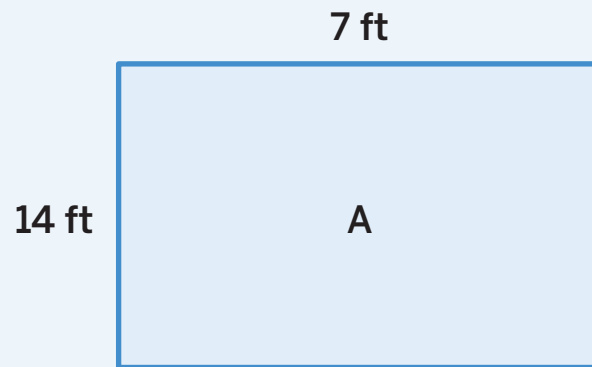
24 = _____

Discuss 

Compare your equations. How are they similar? How are they different?


Summary 5.12

The perimeter of any rectangle is 2 times the sum of the length and the width.

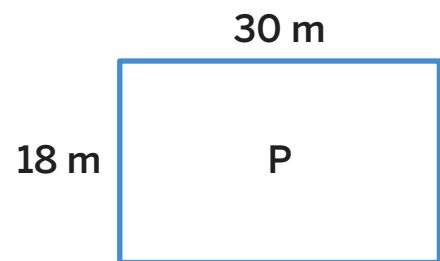


Perimeter is $2 \times (\ell + w)$.
The perimeter of Rectangle A is $2 \times (7 + 14)$.
 $P = 2 \times 21$
 $P = 42$ feet

Practice 5.12

- 1  Select *all* the expressions that represent the perimeter of Rectangle P.

- A. $2 \times 18 + 30$
- B. 2×48
- C. 18×30
- D. $18 + 30 + 18 + 30$
- E. $(30 + 18) \times 2$
- F. 38×2



Practice 5.12

Name _____ Date _____

For Problems 2–4, use the table and the clues to determine the length, width, and perimeter of the rectangle.

Rectangle Q	
length (in.)	6
width (in.)	2
perimeter (in.)	16

- 2 Rectangle R has a length that is 4 times the length of Rectangle Q and a width that is 3 times the width of Rectangle Q.

Rectangle R	
length (in.)	
width (in.)	
perimeter (in.)	

- 3 Rectangle S has a length and width that is $\frac{1}{2}$ the length and width of Rectangle Q.

Rectangle S	
length (in.)	
width (in.)	
perimeter (in.)	

- 4 Complete the statement.
The length of Rectangle Q is _____ times the length of Rectangle S.

Practice 5.12

Name _____ Date _____

- 5 Draw a rectangle that has a perimeter of 36 units and 1 side length that is 5 times as long as the other. Label the side lengths.

 Draw

Spiral Review

- 6 Order the numbers from *least* to *greatest*.

81,377

82,799

72,068

79,335

72,091

least

greatest

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

7 12×7 _____

8 8×8 _____

9 3×6 _____

10 $15 \div 5$ _____

11 $24 \div 2$ _____

12 $80 \div 10$ _____

Problem Solving With Measurement

Unit Story: Just for Fun



Arh-sib/Shutterstock.com

Lucas tried out swimming, soccer, disc throwing, roller skating, art class, and a cooking class at the community center. How is math involved in those activities?

Paint Can Mystery

Let's solve multi-step problems with liters and milliliters.



Warm-Up



eyes on teacher



I can be all of me in math class.

How do you feel when you are not sure how to solve a problem in math class?

Activity

1

How Much Paint?

Hands-On

You and your group will be given a set of cards with clues about paint cans purchased for the community center painting class. Use the information: 1 liter (L) = 1,000 (mL).

- Use the clues to determine the amount of paint in each can. Be prepared to explain what information from the clues was important and how you used it to solve the problem.



Show your thinking.

Can _____: _____

Can _____: _____

Can _____: _____

Can _____: _____

Can _____: _____

Can _____: _____

Mural Project

- 2 Lucas and the other students in class will be painting a mural at the community center. They need 20 liters of paint for the mural. If they use all 6 paint cans (A–F) from Activity 1, will they have enough paint? If not, how much more paint will they need?

 Show your thinking.

answer: _____

Summary 5.13

Liters (L) and **milliliters** (mL) are units of liquid volume in the metric system. 1 liter is equivalent to 1,000 milliliters, so you can multiply any measurement in liters by 1,000 to determine the equivalent measurement in milliliters.

Bottle Z has 4 times the amount of water as Bottle H.

Bottle H has 2 liters of water.

How many milliliters of water are in each bottle?

$$1 \text{ L} = 1,000 \text{ mL}$$

$$2 \times 1,000 = 2,000$$

Bottle H has 2,000 milliliters of water.

$$4 \times 2,000 = 8,000$$

Bottle Z has 8,000 milliliters of water.

milliliter A unit of measurement for liquid volume that is equal to one thousandth of a liter.

Practice 5.13

For Problems 1–5, complete the comparison statement using $<$, $>$, or $=$.


1 10 milliliters _____ 1 liter

2 200 milliliters _____ 2 liters

3 4,000 milliliters _____ $3\frac{1}{2}$ liters

4 5,000 milliliters _____ 5 liters

5 10,000 milliliters _____ 6 liters

- 6  Complete the table with the missing number of liters or milliliters.

Liters (L)	Milliliters (mL)
	1,000
	8,000
15	
22	
	3,000
10	

- 7 Priya has 4 jars, each with a different amount of water. Order the jars from *least* amount of water to *greatest* amount of water.

Jar A: $\frac{1}{2}$ as much as Jar D

Jar B: 3 times as much as Jar C

Jar C: 750 milliliters

Jar D: $2\frac{1}{2}$ liters

 Show or explain your thinking.

answer: _____

Practice 5.13

Name _____ Date _____

- 8** Clare purchased 2 water bottles at the grocery store. The first bottle held 591 milliliters, and the second bottle held 237 milliliters. Does Jada have *more* or *less* than 1 liter of water in total?

i Show your thinking.

answer: _____

Spiral Review

- 9** Which expressions have a value *less than* 1? Select *all* that apply.

(A) $\frac{58}{100} + \frac{4}{10}$

(B) $\frac{42}{100} + \frac{5}{10}$

(C) $\frac{21}{100} + \frac{8}{10}$

(D) $\frac{65}{100} + \frac{5}{10}$

(E) $\frac{2}{100} + \frac{9}{10}$

(F) $\frac{47}{100} + \frac{6}{10}$

For Problems 10–15, determine the value of the expression.

10 6×5 _____

11 8×4 _____

12 $24 \div 4$ _____

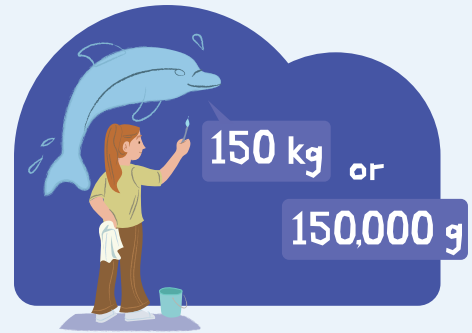
13 $48 \div 12$ _____

14 $66 \div 11$ _____

15 $56 \div 8$ _____

Animal Riddles

Let's compare amounts in kilograms and grams.



Warm-Up



eyes on teacher

I can be all of me in math class.

What do you do when you are not sure how to solve a problem in math class?

Activity

1

Card Sort: Comparing Animal Weights

Hands-On

Your group will be given a set of cards with information about the typical adult weight in grams or kilograms of some animals. Use the information: 1 kilogram (kg) = 1,000 grams (g).

1 Sort

Work with your group to compare the animal weights on your cards and arrange them in order from *lightest* to *heaviest* weight.

2 Join with another group and combine your cards. Arrange the cards in order from *lightest* to *heaviest* weight. Record your results in the table, starting with the *lightest* animal listed in the first row.

Animal	Weight

Card Sort: Comparing Animal Weights (continued)

- 3 Use the information on the cards to solve the animal riddle.

river otter
9,000 g

tiger
120 kg

Which weighs more — 100 river otters or 10 tigers?

 Show or explain your thinking.

answer: _____

- 4 Write and solve your own animal riddle.

Which weighs more — _____ or _____?

 Show or explain your thinking

answer: _____

Summary 5.14

Grams and kilograms are measurement units for weight in the metric system. 1 kilogram (kg) is equal to 1,000 grams (g). The relationship between grams and kilograms can be used to compare weights given in different units.



hedgehog
800 g



giraffe
800 kg

$800 \times 1,000 = 800,000$, so $800 \text{ kg} = 800,000 \text{ g}$
A giraffe weighs more than a hedgehog.

Practice 5.14

- 1 Use the image in the Summary to solve the problem.
Which weighs more — 1,000 hedgehogs or 10 giraffes?

i Show or explain your thinking.

answer: _____

Practice 5.14

Name _____ Date _____

For Problems 2–5, use the information on the cards.

chipmunk
60 g

tamarin
420 g

flying fox
1 kg

pink fairy
armadillo
120 g

- 2 Which weighs more — 10 tamarins or 30 pink fairy armadillos?



Show or explain your thinking.

answer: _____

- 3 Which weighs more — 60 chipmunks or 4 flying foxes?





Show or explain your thinking.

answer: _____

Practice 5.14

Name _____ Date _____

- 4  Which group of animals weighs the *least*?
- (A) 300 chipmunks (B) 30 tamarins
(C) 15 flying foxes (D) 150 pink fairy armadillos
- 5  Which group of animals weighs the *most*?
- (A) 35 chipmunks (B) 4 tamarins
(C) 2 flying foxes (D) 20 pink fairy armadillos

Spiral Review

- 6 Priya ran $5\frac{3}{5}$ kilometers on Saturday and $7\frac{4}{5}$ kilometers on Sunday. What was the total distance Priya ran over the weekend?
- _____

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

 Show your thinking.

7 $2,084 + 2,967$

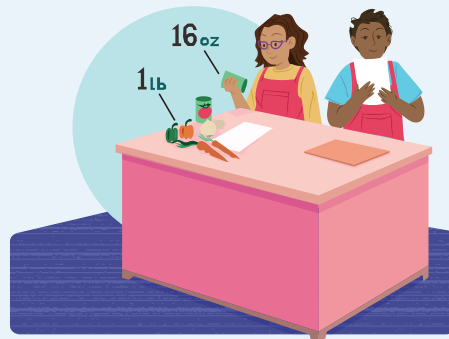
answer: _____

8 $2,967 - 2,084$

answer: _____


Cooking Class

Let's solve multi-step problems about pounds and ounces.



Warm-Up



 eyes on teacher

We are a math community.

What words would you use to describe the community in your math class?

Activity

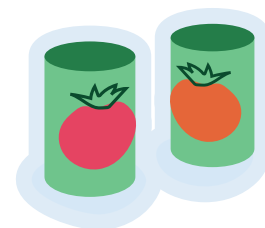
1

Making Vegetarian Chili

Lucas learned how to make vegetarian chili in his cooking class, and he wants to make it for his family. He needs to make a shopping list for his parents with the chili ingredients and how much of each ingredient needs to be purchased.

Hands-On

You and your group will be given a set of cards with clues about the weights of the ingredients. Use the information: 1 pound (lb) = 16 ounces (oz).



1**Making Vegetarian Chili (continued)**

- 1** Use the clues to determine the weight of each ingredient needed in **pounds** and **ounces**.

Ingredient	Weight		Work or explanation
	Pounds (lb)	Ounces (oz)	
beans			
bell peppers			
carrots			
diced tomatoes			
green chiles			
onions			
tomato paste			

2

Grocery Shopping

Lucas used the weekly ad from the local grocery store to look up the prices for the chili ingredients and made the following list.

- beans: \$1.00 for each 16-ounce can
- bell peppers: \$1.50 for 1 pound
- carrots: \$1.00 for 1 pound
- diced tomatoes: \$1.25 for each 14-ounce can
- green chiles: \$1.00 for each 4-ounce can
- onions: \$1.00 for 1 pound
- tomato paste: \$1.00 for each 4-ounce can

- 2 If Lucas's parents give him \$20 to spend at the grocery store, is that enough money for him to buy *all* the ingredients he needs for the chili recipe? If it is not enough, how much more does he need? Talk with your partner about how you know whether Lucas has enough money to buy all of the ingredients.



Show or explain your thinking.

answer: _____

Summary 5.15

Pounds and **ounces** are measurement units for weight in the U.S. Customary system. 1 pound (lb) is equal to 16 ounces (oz) in weight.

$$1 \text{ lb} = 16 \text{ oz}$$

$$2 \text{ lb} = 32 \text{ oz}$$

$$3 \text{ lb} = 48 \text{ oz}$$

$$4 \text{ lb} = 64 \text{ oz}$$

$$5 \text{ lb} = 80 \text{ oz}$$

ounce A unit of measurement for weight. There are 16 ounces in 1 pound.

pound A unit of measurement for weight that is equal to 16 ounces.

Practice 5.15

- 1 A granola recipe includes oats and coconut flakes. Han uses 2 pounds of old-fashioned oats. The weight of the oats is 4 times the weight of the coconut flakes that Han needs. How many ounces of coconut flakes does Han need?




 Show or explain your thinking.

answer: _____

- 2 The table shows the ingredients for granola. Complete the table with the missing number of pounds or ounces.

Ingredient	Pounds (lb)	Ounces (oz)
pecans		24
pepitas	$\frac{3}{4}$	12
coconut oil	$\frac{1}{2}$	8
honey	1	

For Problems 3–5, use the table from Problem 2 to complete the statement.

- 3  There is _____ times as much honey as coconut oil.
(A) $\frac{1}{2}$ (B) $1\frac{1}{2}$ (C) 2 (D) 4
- 4  There are _____ times as many pecans as coconut oil.
(A) $1\frac{1}{2}$ (B) 2 (C) 3 (D) 4
- 5  There are _____ times as many pepitas as pecans.
(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $1\frac{1}{2}$ (D) $2\frac{1}{2}$

Spiral Review

6 Which number is the *greatest*?

- (A) 609,082 (B) 609,048 (C) 609,487 (D) 609,884

7 Which number is the *least*?

- (A) 124,702 (B) 124,684 (C) 124,784 (D) 124,698

8 Which number is the *greatest*?

- (A) 315,087 (B) 315,708 (C) 315,078 (D) 315,807

For Problems 9 and 10, determine the value of the expression using the standard algorithm.



Show your thinking.

9 $9,376 + 5,384$

answer: _____

10 $9,376 - 5,384$

answer: _____

Cook It

Let's solve problems with units of time.



Warm-Up

1

eyes on teacher

I can be all of me in math class.

How do you feel when you solve a challenging problem in math class?

Activity

1

Tricky Timers

2

Lucas is cooking chili for his family. He knows the recipe should take 2 hours, but his timer only shows minutes. How many minutes should Lucas set his timer for?

_____ minutes



3

Now Lucas is making a pizza. This recipe takes $\frac{2}{3}$ hours to make. How many minutes should Lucas set his timer for?

_____ minutes



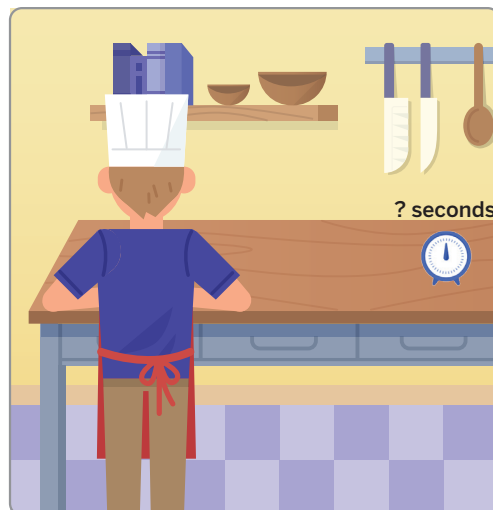
1

Tricky Timers (continued)

4

Lucas wants to cook an omelet. It takes 5.5 minutes to cook, but now he can only find a timer that measures seconds! There are 60 **seconds** in 1 minute. How many *seconds* should Lucas set his timer for?

_____ seconds



5

Discuss 

How can you determine the number of minutes for any number of hours?

How can you determine the number of seconds for any number of minutes?

Multi-Step Recipes

6 How many seconds will it take to make this recipe for stir fry?

Steps	Time (minutes)
chop vegetables	2.5
cook	10

_____ seconds

7 Discuss 

How did you determine the number of seconds it takes to make the recipe for stir fry?

Multi-Step Recipes (continued)

8

Design a Challenge

- Trade your *Design a Challenge* sheet with a partner.
- Record the unit of time for the challenge question and the times for prep, mix, and cook for your partner's challenge. Then answer their challenge question to determine how long it will take to make their recipe.
- Repeat the challenge with 2 other partners.

Challenge 1: How many _____ will it take to make my recipe?

Prep: _____

Mix: _____

Cook: _____

Challenge 2: How many _____ will it take to make my recipe?

Prep: _____

Mix: _____

Cook: _____

Challenge 3: How many _____ will it take to make my recipe?

Prep: _____

Mix: _____

Cook: _____

9

Discuss

Let's discuss how many minutes it will take to make a recipe.

Summary 5.16

Hours, minutes, and **seconds** are measurement units of time. 1 hour is 60 times as long as 1 minute, and 1 minute is 60 times as long as 1 second. You can use the relationships between units of time to solve problems.

It took Diego $1\frac{1}{2}$ hours to get home from school yesterday.

How many minutes is that? How many seconds?

$$1 \text{ hour} = 60 \text{ minutes}$$

$$1 \text{ minute} = 60 \text{ seconds}$$

$$\frac{1}{2} \text{ hours} = 30 \text{ minutes}$$


$$90 \times 60 = 5,400$$

$$1\frac{1}{2} \text{ hours} = 90 \text{ minutes}$$

$$1\frac{1}{2} \text{ hours} = 5,400 \text{ seconds}$$

second A unit of measurement for time. There are 60 seconds in 1 minute.

Practice 5.16

- 1  Jada and her brother did their weekly chores. Complete the table with the missing number of hours or minutes.

Activity	Hours	Minutes
pull weeds		90
mop		30
dust	$\frac{1}{4}$	
clean bedrooms	2	

Use the information for Problems 2 and 3.

Han rode his bike 45 minutes on Saturday and $2\frac{1}{4}$ hours on Sunday.

- 2 How long did Han ride his bike over the weekend in both hours and minutes?

 Show or explain your thinking.

hours: _____

minutes: _____

- 3 Complete the statement.

 Show or explain your thinking.

Han rode his bike _____ times as long on Sunday than Saturday.

Practice 5.16

Name _____ Date _____

For Problems 4 and 5, complete the comparison statement using $<$, $>$, or $=$.

4 $4\frac{1}{2}$ hours _____ 270 minutes

5 $2\frac{1}{2}$ hours _____ 200 minutes

Spiral Review

For Problems 6 and 7, evaluate the expression.

i Show your thinking.

6 $\frac{26}{100} + \frac{5}{10} + \frac{18}{100}$

7 $\frac{84}{100} - \frac{3}{10}$

answer: _____

answer: _____

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

8 3×7 _____

9 $24 \div 8$ _____

10 9×6 _____

11 $72 \div 12$ _____

12 4×5 _____

13 $16 \div 8$ _____

Would You Rather?

Let's compare units of measure.



Warm-Up



 eyes on teacher

I can be all of me in math class.
What helps you solve challenging problems in math class?

Activity

1

Introducing the Center, Would You Rather?

Stage 1



Pairs  Let's compare smaller measurements.

You'll need: number cube, paper clip, Recording Sheet, Spinner



How to Play

- 1 Player A:** Spin the Spinner to determine the units. Roll the number cube to determine how many of that unit.
- 2 Player A:** Choose a *smaller* unit of measurement and a number of those units. Ask your partner a question comparing the measurements. *Sample question:* Would you rather have 2 feet or 20 inches?
- 3 Player B:** Record the units and number of units for each part of the question.
- 4 Player B:** Answer your partner's question, paying attention to whether you want *more* (Rounds 1–3) or *less* (Rounds 4–6). Explain your choice. If both players agree that your answer is correct, you earn 1 point.
- 5** Take turns until each player's Recording Sheet is full.



How to Win The player who earns more points wins.

Would You Rather? (continued)

You want <i>more</i>		
Would you rather have ____	or ____?	Points
You want <i>less</i>		
Would you rather have ____	or ____?	Points

“Would You Rather?” Riddles

Write 3 “Would you rather?” riddles. For each riddle:

- Choose 2 related units from the same measurement system.
- Choose a number for each unit and something to compare.
- Show any unit conversions that are required to answer the riddle.
- Complete the sentences with how you would answer the riddle.

Metric system			Customary system		
kilometers (km)	meters (m)	centimeters (cm)	yards (yd)	feet (ft)	inches (in.)
	liters (L)	milliliters (mL)	hours (hr)	minutes (min)	seconds (sec)
kilograms (kg)	grams (g)		pounds (lb)	ounces (oz)	

1 Would you rather have _____

or _____?

 Show or explain your thinking.

I want (*more or less*) _____,

so I would rather have _____.

"Would You Rather?" Riddles (continued)

- 2 Would you rather have _____
or _____?

 Show or explain your thinking.

I want (*more or less*) _____,
so I would rather have _____.

- 3 Would you rather have _____
or _____?

 Show or explain your thinking.

I want (*more or less*) _____,
so I would rather have _____.

Summary 5.17

When comparing 2 measurements given in different units, you can always convert the measurement given in the larger unit to the smaller unit. Sometimes, you can use what you know about the relationship between the units to compare without converting units.

Which is more: 10 kilometers or 100,000 centimeters?	Which is more: 5 hours or 50 minutes?
$1 \text{ km} = 1,000 \text{ m}$ $10 \times 1,000 = 10,000$ $10 \text{ km} = 10,000 \text{ m}$ $1 \text{ m} = 100 \text{ cm}$ $10,000 \times 100 = 1,000,000$ $10 \text{ km} = 1,000,000 \text{ cm}$ $10 \text{ km} > 100,000 \text{ cm}$	<p>Because I know 1 hour is 60 minutes, I know 50 minutes is less than 5 hours.</p> <p>$5 \text{ hours} > 50 \text{ minutes}$</p>

Practice 5.17

- 1 Would you rather have 3,500 grams of quarters or 2 kilograms of quarters?

 Show or explain your thinking.

I want (*more or less*) _____,

so I would rather have _____.

2 Would you rather drink 750 milliliters of milk or 1 liter of milk?

 Show or explain your thinking.

I want (*more or less*) _____,
so I would rather drink _____.



3 Would you rather practice the piano for 720 seconds or 10 minutes?

 Show or explain your thinking.

I want (*more or less*) _____,
so I would rather practice _____.

Practice 5.17

Name _____ Date _____

- 4  Which measurement is the *longest*?
- (A) $1\frac{1}{2}$ kilometers (B) 15 meters
- (C) 15,000 centimeters (D) 10,000 centimeters
- 5  Which measurement is the *shortest*?
- (A) 96 inches (B) 7 feet
- (C) $3\frac{2}{3}$ yards (D) 15 feet

Spiral Review

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

 Show your thinking.

6 $3\frac{5}{8} + 6\frac{7}{8}$

answer: _____

7 $7\frac{1}{6} - 2\frac{3}{6}$

answer: _____

8 $5,555 + 4,275$

answer: _____

9 $7,062 - 2,324$

answer: _____

Math at Work

Everyone gets to play! That's what Sir Ludwig Guttman believed, a neurosurgeon who organized the first sports competition for wheelchair athletes in 1948. This competition later became the Paralympic Games. In the Paralympic Games, athletes with disabilities compete in different sports, including sitting volleyball, wheelchair basketball, para swimming and more.

Athletic trainers work with athletes of all abilities to help prevent and treat injuries. They work in schools, hospitals, fitness centers, and sports teams. They might compare or convert measurements as they design training programs for athletes.



Olga Popova/Shutterstock.com. Antonin Albert/Shutterstock.com.

Math at Home

Work with an adult at home to look up a measurement. Some ideas:

- The court measurements for wheelchair basketball in the Paralympic Games
- Typical adult weight of your favorite animal

Convert this measurement to a different unit. Share your strategy with someone in your home or community.

Math Mindset

What strategy can you use to know which measurement is longer: 8,000 centimeters or 80 kilometers?

Unit 6

Multiplying and Dividing Multi-Digit Numbers

Big Ideas in This Unit

- CC1 Rectangle Investigations
- CC2 Factors and Area Models
- Multi-Digit Numbers
- CC4 Connected Problem Solving

Questions for Investigation

- What strategies can you use to multiply and divide multi-digit numbers?
- What are some different ways to interpret remainders in division?



Explore: Packing Lei

How many total lei could Maile have packed?



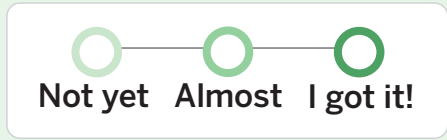
Unit Story: Special Day, Special Lei

In this story, Maile and her family work at Pat's Lei Shop, where they make, sell, and ship Hawaiian lei for special occasions.



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
Multiply a whole number of up to four-digits by a one-digit whole number.	○ — ○ — ○	○ — ○ — ○
Multiply a two-digit whole number by a two-digit whole number.	○ — ○ — ○	○ — ○ — ○
Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors.	○ — ○ — ○	○ — ○ — ○
Interpret a remainder in a division problem.	○ — ○ — ○	○ — ○ — ○
Use estimation to determine the reasonableness of products and quotients.	○ — ○ — ○	○ — ○ — ○
Use the area and perimeter formulas to solve real-world problems involving rectangles.	○ — ○ — ○	○ — ○ — ○
Solve multi-step story problems using the 4 operations, including problems in which remainders must be interpreted.	○ — ○ — ○	○ — ○ — ○

Multi-Digit Multiplication

✦ Unit Story: Special Day, Special Lei



Curioso.Photography/Shutterstock.com

Maile gathered flowers for the lei-making workshop. How could she use multiplication to determine the total number of flowers she gathered for the workshop?

Explore: Packing Lei

How many total lei could Maile have packed?



Warm-Up



eyes on teacher



I am a doer of math.
When have you felt really successful in math?

Discuss

What do you notice? What do you wonder?

Special Day, Special Lei

Unit Story





How many total lei could Maile have packed? Think of *at least 3* possible totals.

- Maile packed less than 150 lei but more than 70 lei.
- The lei were packed into boxes with an equal number of lei in each box.
- There is more than 1 box, and there is more than 1 lei in each box.
- The total number of lei is not a multiple of 10.

Ways to be a mathematician

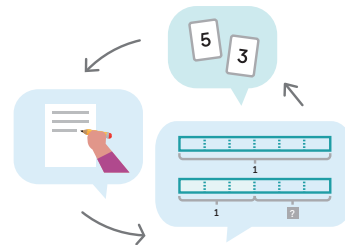
- 1** I can take my time to think about a challenging problem before trying to solve it.

○ ——— ○ ——— ○
Not yet Almost I got it!



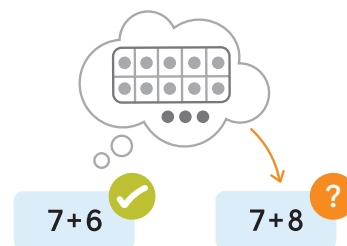
- 2** I can use numbers, words, and diagrams to make sense of math ideas and situations.

○ ——— ○ ——— ○
Not yet Almost I got it!



- 3** I look for strategies that I can apply to new problems.

○ ——— ○ ——— ○
Not yet Almost I got it!



Counting Flowers for Lei

Let's determine products beyond 100.



$$13 * x 80$$



I am a doer of math.

Think of a time when you felt nervous about sharing your ideas in math class. What might have made you feel more comfortable?

Warm-Up



eyes on teacher

Activity

1

How Many Flowers?

Hands-On

- 1 Maile made some small lei for children. She made 8 lei, and each lei had 23 flowers. How many flowers did Maile use for all the lei?



Show or explain your thinking.

answer: _____

2

Discuss

Meet with a partner and explain your strategies to each other.

More Flowers

Hands-On

- 3 Maile made some lei for adults. She made 4 lei and used 35 flowers for each lei. How many flowers did she use for all the lei?

 Show or explain your thinking.

answer: _____

4 Discuss

Meet with a partner and compare your strategies.


What was similar? What was different?

Summary 6.02

When multiplying multi-digit numbers, you can use the Distributive Property to rewrite one of the factors as a sum and multiply each of the addends by the other factor.

$$\begin{array}{r} 4 \times 29 \\ 4 \times (20 + 9) \\ \begin{array}{|c|c|} \hline 20 & 9 \\ \hline \end{array} \\ \begin{array}{|c|c|} \hline 4 & 4 \\ \hline \end{array} \\ \begin{array}{|c|c|} \hline 4 \times 20 = 80 & 4 \times 9 = 36 \\ \hline \end{array} \\ \hline 80 + 36 = 116 \end{array}$$

Practice 6.02

- 1  Diego picked 8 flowers from 15 different plants to make lei. Which expressions could Diego use to determine how many flowers he picked? Select *all* that apply.
- A. 8×15
 - B. $15 + 15 + 15 + 15 + 15 + 15 + 15 + 15$
 - C. $80 + 30$
 - D. $40 + 80$
 - E. $(8 \times 10) + (8 \times 5)$

- 2** Han is going to make 4 lei. Each lei will have 31 flowers. How many flowers will Han need to make all 4 lei?

 **Show or explain your thinking.**

answer: _____

- 3** There were 7 people in a group. The teacher gave each person in the group 45 flowers. How many flowers did the teacher give the group?

 **Show or explain your thinking.**

answer: _____

Practice 6.02

Name _____ Date _____

- 4 There are 5 classes. Each class has 25 students. If Clare makes a lei for each student, how many lei will she make?

 Show or explain your thinking.

answer: _____

Spiral Review

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

 Show your thinking.

5 $3,756 - 3,147$

answer: _____

6 $9,270 - 4,152$

answer: _____

- 7 Write $\frac{9}{4}$ as a sum of fractions in 4 different ways.

$$\frac{9}{4} = \underline{\hspace{2cm}}$$

$$\frac{9}{4} = \underline{\hspace{2cm}}$$

$$\frac{9}{4} = \underline{\hspace{2cm}}$$

$$\frac{9}{4} = \underline{\hspace{2cm}}$$


A Lei-Making Workshop

Let's multiply a three-digit or four-digit number with a one-digit number.



Warm-Up



 eyes on teacher



I can be all of me in math class.

How have you grown as a mathematician so far this year?

Activity

1

Flowers for the Workshop

- 1 Maile has 3 baskets of flowers she organized for a lei-making workshop. There are 135 flowers in each basket. How many total flowers does Maile have for the workshop?



Show your thinking.

answer: _____

1**Flowers for the Workshop (continued)**

- 2** Pat's Lei Shop received a shipment of flowers for additional lei-making workshops. The shipment included 3 boxes of flowers with 2,135 flowers in each box. How many total flowers were in the shipment?



Show your thinking.

answer: _____

3 **Discuss** 

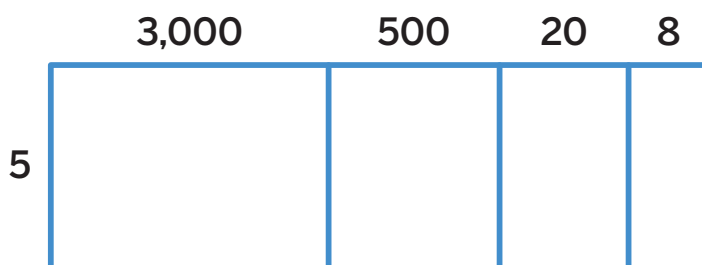
Compare the strategies you used for each problem.

- How did you decompose factors to help you multiply?
- What was similar? What was different?

Multiplying With Area Diagrams

- 4 Complete the area diagram to determine the value of $5 \times 3,528$.

Show your thinking.



answer: _____

Multiplying With Area Diagrams (continued)

Use an area diagram to determine the value of each expression.



Show your thinking.

5

5×618

answer: _____

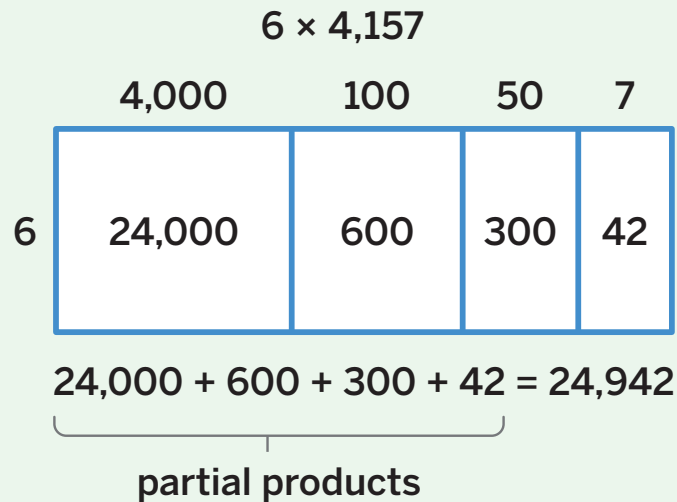
6

$5 \times 4,618$

answer: _____

Summary 6.03

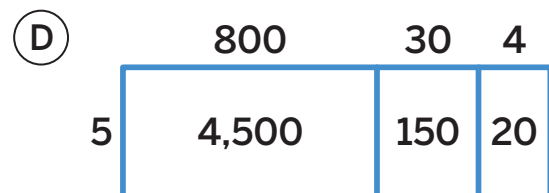
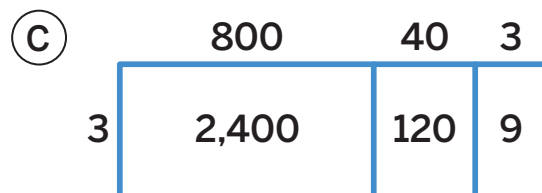
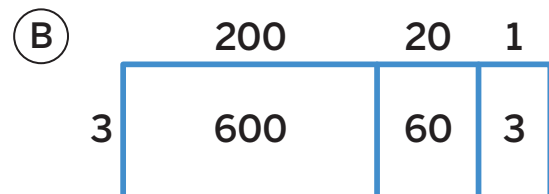
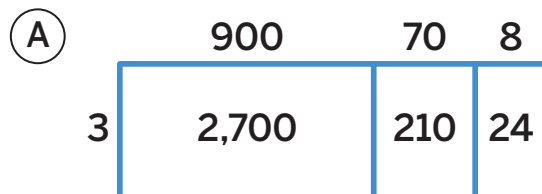
Decomposing by place value and using the expanded form of a multi-digit factor is a useful strategy for multiplying. The products you get from multiplying the addends and the factor are called **partial products** and are added together to get the final product.



partial product The value obtained when multiplying the parts of 2 numbers separately (which is then added to other partial products to arrive at the total product)

Practice 6.03

1 Which area diagram could be used to determine the value of 3×843 ?

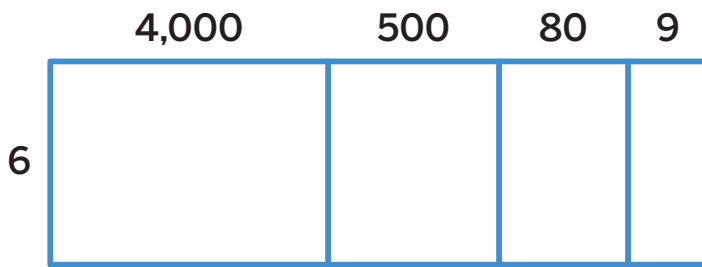


Practice 6.03

Name _____ Date _____

- 2 Complete the area diagram to determine the value of $6 \times 4,589$.

i Show your thinking.



answer: _____

For Problems 3 and 4, use an area diagram to determine the value of the expression.

i Show your thinking.

3 4×572

answer: _____

4 $3,791 \times 9$

answer: _____

Practice 6.03

Name _____ Date _____

- 5 Pat's Pet Shop received a shipment of dog treats. The shipment included 3 boxes of dog treats with 1,578 treats in each box. How many dog treats were in the shipment?

 Show your thinking.

answer: _____

Spiral Review

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

 Show your thinking.

6 $5,538 + 2,042$

answer: _____

7 $6,082 + 2,096$

answer: _____

For Problems 8 and 9, determine the value of the expression.

8 6×12 _____

9 9×8 _____

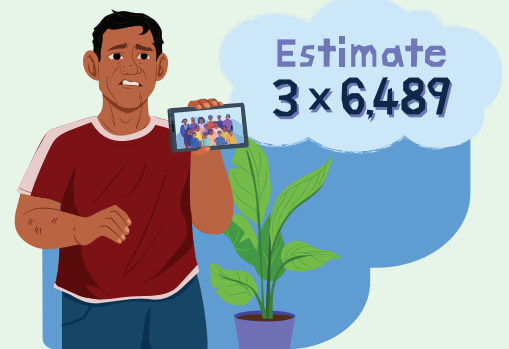
Name _____ Date _____

Factors and Area Models Multi-Digit Numbers

4.NBT.5, 4.NBT.2, 4.NBT.3, SMP.2, SMP.3, SMP.7

A Reasonable Answer

Let's use estimation to help us multiply multi-digit numbers.

**We are a math community.**

Think about how Maile helped Paul in the Unit Story. How can math be used to help everyone use their voice in class?

Warm-UpA target icon with an arrow in the center.
eyes on teacher

Activity

1

Incoming Shipments

Maile needs estimates for the total number of different items packed in boxes. Estimate each product.

**Show your thinking.**

1

A shipment of pink flowers included 3 boxes of flowers with 6,489 flowers in each box. About how many flowers were in the shipment altogether?

estimate: _____

Incoming Shipments (continued)

Estimate each product.

i Show your thinking.

- 2** A shipment of string included 4 boxes with 781 pieces of string in each box. About how many pieces of string were in the shipment altogether?

estimate: _____

- 3** A shipment of leaves included 5 boxes with 672 leaves in each box. About how many leaves were included in the shipment altogether?

estimate: _____

- 4** A shipment of purple flowers included 6 boxes with 2,463 flowers in each box. About how many purple flowers were included in the shipment altogether?

estimate: _____

2

Estimate Then Multiply

Estimate the product and then determine the exact answer. Use your estimate to determine whether your answer is reasonable.

5 $8 \times 4,973$



Show your thinking.

estimate: _____

answer: _____

Estimate Then Multiply (continued)

Estimate the product and then determine the exact answer. Use your estimate to determine whether your answer is reasonable.

6 3×851

 Show your thinking.

estimate: _____

answer: _____

7 **Discuss** 

How can you use estimation to help you check the reasonableness of your answers when multiplying with multi-digit numbers?

Summary 6.04

When multiplying with multi-digit numbers, you can estimate the product and use your estimate to determine whether your final answer is reasonable.

$$6,409 \times 5$$

estimate: $5 \times 6,000 = 30,000$

	6,000	400	9
5	$5 \times 6,000$ 30,000	5×400 2,000	5×9 45

$$30,000 + 2,000 + 45 = 32,045$$

32,045 is close to 30,000, so my answer is reasonable.

Practice 6.04

- 1 Estimate the product 3×734 .

 Show your thinking.

answer: _____

2 Which is the best estimate for 745×5 ?

(A) 5,600

(B) 4,900

(C) 14,000

(D) 3,500

3  Determine the product.
 745×5 .

 Show your thinking.

answer: _____


4 Which is the best estimate for $4,742 \times 9$?

(A) 45,000

(B) 30,000

(C) 36,000

(D) 24,000

5  Determine the product.
 $4,742 \times 9$.

 Show your thinking.

answer: _____

Practice 6.04

Name _____ Date _____

- 6 Estimate the product $3 \times 8,249$.

i Show your thinking.

answer: _____

Spiral Review

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

i Show your thinking.

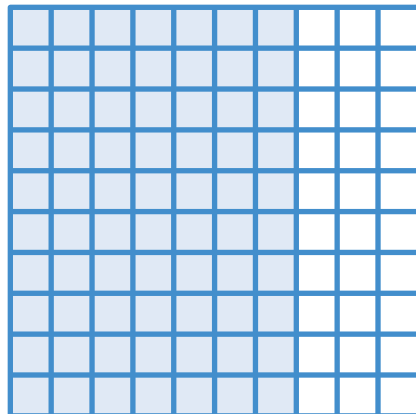
7 $9,385 - 7,048$

answer: _____

8 $5,266 - 2,176$

answer: _____

- 9 The large square represents 1 whole. Write 2 different fractions and a decimal to represent the diagram.



fractions: _____

decimal: _____

Three of a Kind

Let's use partial products to multiply multi-digit numbers.



Warm-Up



eyes on teacher



I am a doer of math.
How can a mistake help you learn and grow as a mathematician?

Activity

1

Three Cheers for Partial Products

Here are 3 ways that students represented their work for 7×124 .

Shawn's work

	100	20	4
7	700	140	28
	$700 + 140 + 28 = 868$		

Clare's work

$$7 \times 124$$

$$7 \times 100 = 700$$

$$7 \times 20 = 140$$

$$7 \times 4 = 28$$

$$700 + 140 + 28 = 868$$

Diego's work

124	
x 7	
28	7×4
140	7×20
+ 700	7×100
868	

1**Three Cheers for Partial Products (continued)****1****Discuss** 

Compare each student's work. How is their work similar? How is it different? Which representation makes the most sense to you? Why?

Choosing Your Way

Determine each product.

 Show your thinking.

2 841×3

answer: _____

3 $4 \times 5,342$

answer: _____

Choosing Your Way (continued)



Show your thinking.

4

$7,289 \times 7$

answer: _____

5


$8 \times 3,419$

answer: _____

Summary 6.05

When multiplying, you can use area diagrams, equations, or expressions to represent partial products strategies.

$$342 \times 4$$

Representations		
 <p>$1,200 + 160 + 8 = 1,368$</p>	$300 \times 4 = 1,200$ $40 \times 4 = 160$ $2 \times 4 = 8$ $1,200 + 160 + 8 = 1,368$	$\begin{array}{r} 342 \\ \times 4 \\ \hline 8 \\ 160 \\ + 1,200 \\ \hline 1,368 \end{array}$ <p>4×2 4×40 4×300</p>

Practice 6.05

- 1 Determine the product 365×7 using the partial products algorithm.

Show your thinking.

answer: _____

For Problems 2–4, determine the product using any strategy.

 **Show your thinking.**

2 708×6

answer: _____

3 $1,724 \times 9$


answer: _____

4 $8,017 \times 8$

answer: _____

Practice 6.05

Name _____ Date _____

- 5  Determine the product.

$$6,392 \times 4$$

- (A) 24,568 (B) 25,468 (C) 25,568 (D) 26,568

Spiral Review

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

 Show your thinking.

6 $3,145 + 2,923$

answer: _____

7 $4,055 + 2,147$

answer: _____

- 8 Han walked his dog $\frac{5}{10}$ miles every day for 6 days. What was the total distance Han walked his dog for the 6 days?

 Show your thinking.

answer: _____

Name _____ Date _____

Rectangle Investigations

Factors and Area Models

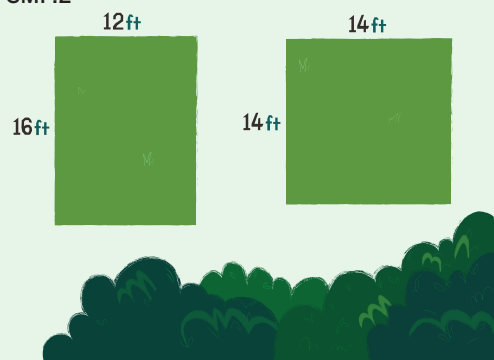
Multi-Digit Numbers

Connected Problem Solving

4.NBT.5, 4.NBT.2, 4.MD.3, SMP.2

Growing Flowers for the Lei

Let's use strategies to multiply 2 two-digit numbers.



Warm-Up



eyes on teacher

**I am a doer of math.**

What makes you curious about math?

Activity

1

Which Garden Is Larger?

You and your partner will be given tools to create a visual display.

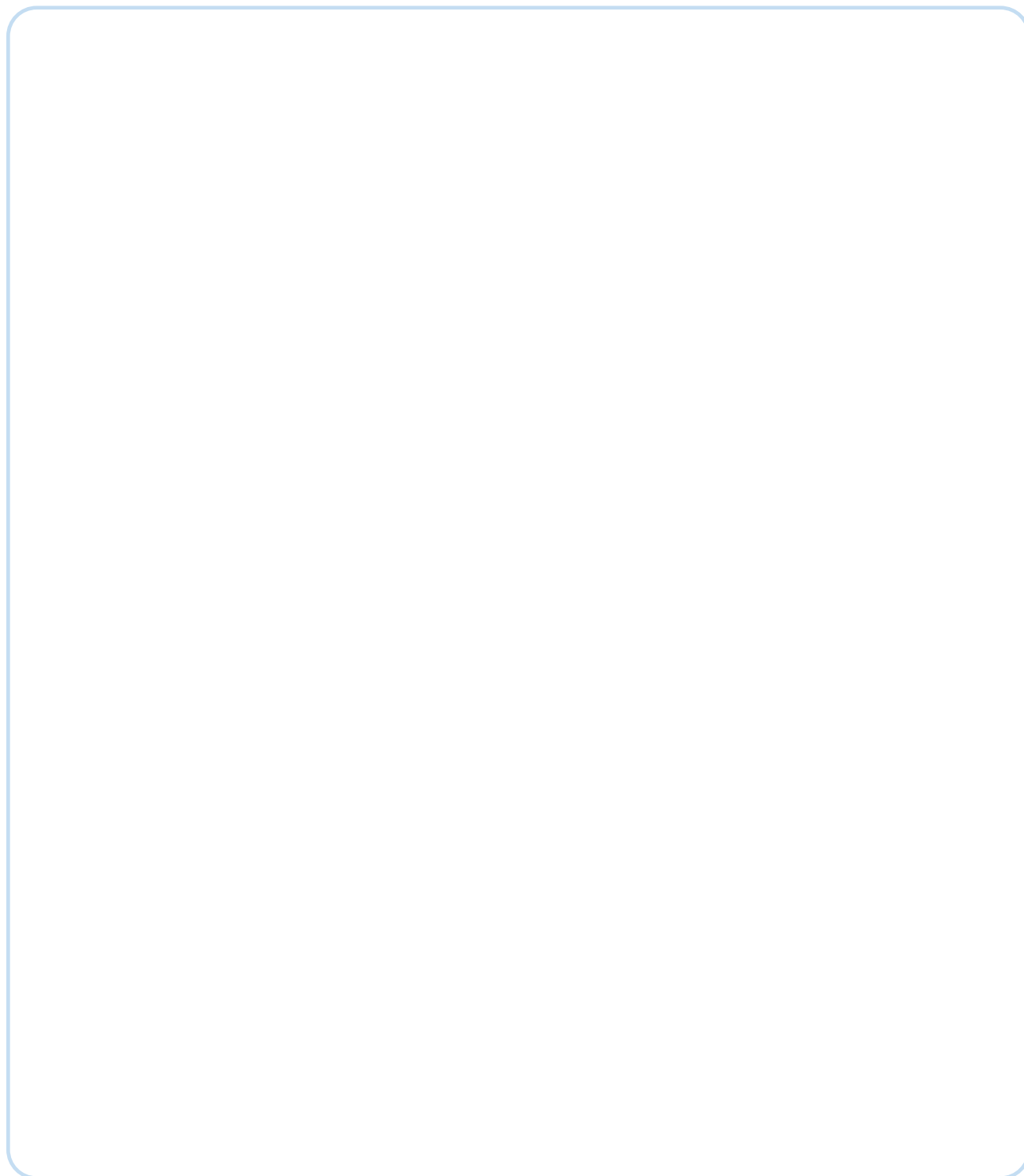
- Maile is visiting a farm that has gardens for flowers used to make lei. The first flower garden is a rectangle that is 12 feet by 16 feet. The second flower garden is a rectangle that is 14 feet by 14 feet. Which garden has a larger area? Justify your answer.

Create a visual display that shows which garden has a larger area. Your visual display should include:

- Diagrams
- Words
- Equations

Which Garden Is Larger? (continued)

You may use this page to brainstorm ideas, show calculations, or show other work.



Summary 6.06

You can multiply 2 two-digit numbers using the same strategies you used to multiply other multi-digit numbers.

6×375	37×65
$6 \times 300 = 1,800$ $6 \times 70 = 420$ $6 \times 5 = 30$	$30 \times 60 = 1,800$ $30 \times 5 = 150$ $7 \times 60 = 420$ $7 \times 5 = 35$
$1,800 + 420 + 30 = 2,250$	$1,800 + 150 + 420 + 35 = 2,405$

Practice 6.06

- 1 Jada has a flower garden that is 15 feet by 25 feet. Shawn has a flower garden that is 18 feet by 23 feet. Who has a larger flower garden? Explain your thinking.

- 2** Diego has 2 rectangular wooded areas near his house. The first wooded area is 19 yards by 15 yards. The second wooded area is 17 yards by 17 yards. Which wooded area has a larger area?

i Show your thinking.

answer: _____


- 3** There are 2 dog parks near Clare's house. She wants to take her dog to the bigger park. The first park is 16 meters by 12 meters. The second park is 13 meters by 14 meters. Which park should Clare take her dog to?

i Show your thinking.

answer: _____

Practice 6.06

Name _____ Date _____

- 4  Priya's grandmother is building a garden with 4 sections. Which garden section has the greatest area?

(A) 20 feet by 12 feet

(B) 19 feet by 15 feet

(C) 16 feet by 13 feet

(D) 11 feet by 28 feet

Spiral Review

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

 Show your thinking.

5 $6,723 - 4,015$

answer: _____

6 $4,388 - 3,647$

answer: _____

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

7 $60 \div 6$ _____

8 $28 \div 7$ _____

9 12×4 _____

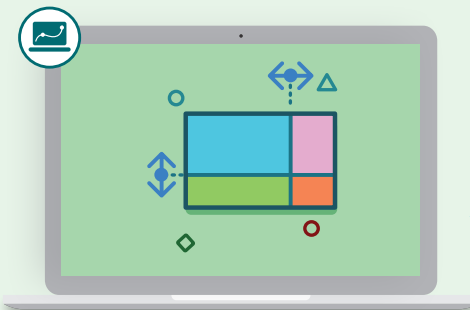
10 6×5 _____

11 $15 \div 3$ _____

12 4×9 _____

Double Decomposition

Let's multiply 2 two-digit numbers using an area diagram.



Warm-Up

1

eyes on teacher

I can be all of me in math class.

How could you be flexible in math class today?

Activity

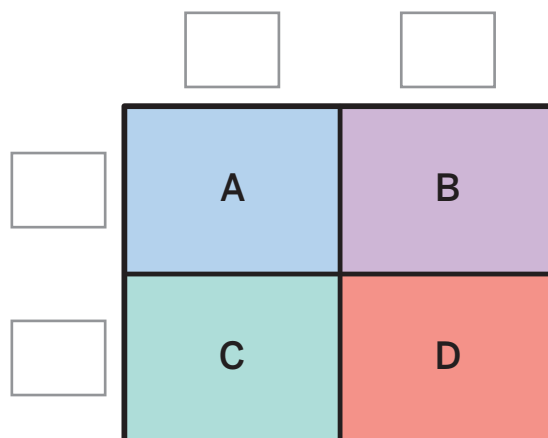
1

Digits in Disguise

2

Label each side of the area diagram to show how you would decompose each factor to multiply 34×25 .

Show your thinking.



Explain

Explain why you chose to decompose the factors in this way.

1**Digits in Disguise (continued)**

- 3** For Parts A–D of the area diagram in the previous problem, calculate the partial product.

Part	Partial product
A	
B	
C	
D	

- 4** Determine the product 34×25 using the area diagram and partial products.

 **Show your thinking.**

answer: _____

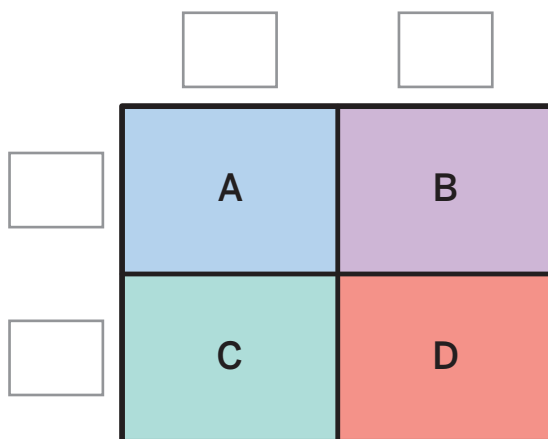
- 5** **Discuss** 

Which area diagram would be more helpful for determining the product 55×34 ? Why?

Area Model Challenge

- 6** Label each side of the area diagram to show how you would decompose each factor to multiply 27×46 . Calculate each partial product.

Part	Partial product
A	
B	
C	
D	



- 7** Determine the product 27×46 using the area diagram and partial products.



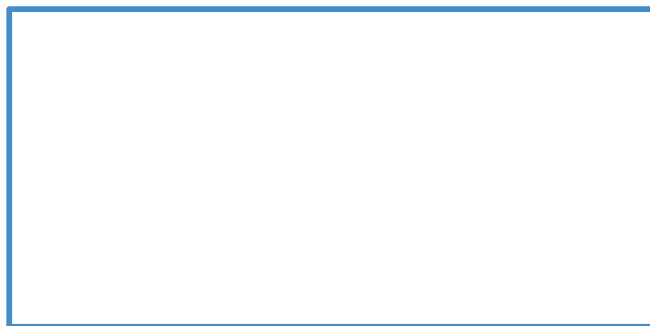
Show your thinking.

answer: _____

Area Model Challenge (continued)

- 8** Determine the product 49×57 . Use the area diagram if it is helpful.

i Show your thinking.



answer: _____

- 9** Explain 

Jada determined the partial products of 74×62 using an area diagram. Here is her work. Do you agree with Jada? Why or why not?

	70	4
60	420	240
2	140	8

Summary 6.07

When multiplying 2 two-digit numbers, it is helpful to decompose each number by place value to determine the partial products. You can keep track of your partial products and expressions with an area diagram.

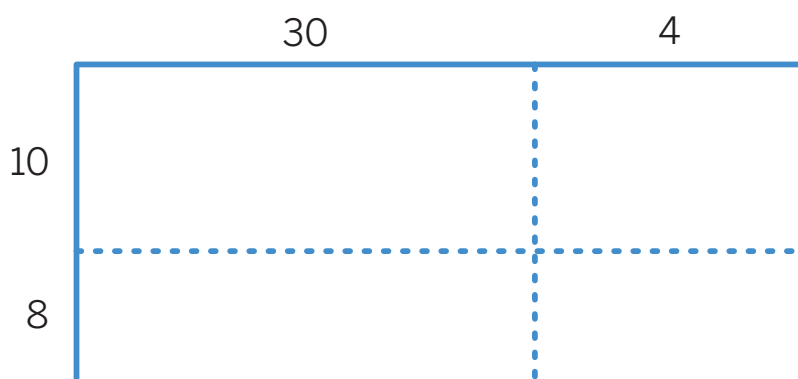
$$42 \times 35$$

	40	2
30	$30 \times 40 = 1,200$	$30 \times 2 = 60$
5	$5 \times 40 = 200$	$5 \times 2 = 10$

$$1,200 + 200 + 60 + 10 = 1,470$$

Practice 6.07

- 1 The area diagram represents 34×18 . Complete the diagram to show the partial products. Then determine the product.



answer: _____

Practice 6.07

Name _____ Date _____

For Problems 2 and 3, determine the product using an area diagram. Include an expression or equation for each partial product.

 Show your thinking.

2 28×49


answer: _____

3 63×26

answer: _____

Practice 6.07

Name _____ Date _____

4  When using an area diagram, which expressions could be used to determine the value of 21×39 ? Select *all* that apply.

A. 1×30

B. 3×9

C. 20×30

D. 20×9

E. 2×1

F. 9×1

Spiral Review

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

 Show your thinking.

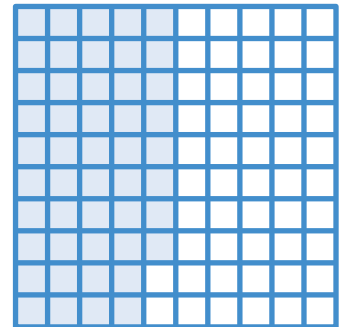
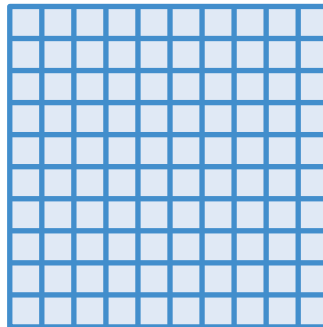
5 $7,678 + 3,401$

answer: _____

6 $4,635 + 6,235$

answer: _____

7 Each large square represents 1 whole. Write a fraction and a decimal to represent the diagram.

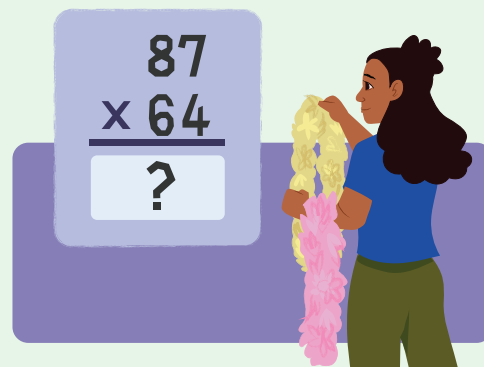


fraction: _____

decimal: _____

Revisiting Strategies

Let's use partial products to multiply 2 two-digit numbers.



I am a doer of math.

When did you feel successful in math class? What made you feel successful?

Warm-Up



eyes on teacher

Activity

1

Compare and Complete

Here are 3 ways that students represented their work for 87×64 .

Shawn's strategy

	60	4
80	80×60 4,800	80×4 320
7	7×60 420	7×4 28
	$4,800 + 320 + 420 + 28 = 5,568$	

Clare's strategy

$$87 \times 64$$

$$80 \times 60 = 4,800$$

$$80 \times 4 = 320$$

$$7 \times 60 = 420$$

$$7 \times 4 = 28$$

$$4,800 + 320 + 420 + 28 = 5,568$$

Diego's strategy

$$\begin{array}{r} 87 \\ \times 64 \\ \hline 28 \quad 4 \times 7 \\ 320 \quad 4 \times 80 \\ 1420 \quad 60 \times 7 \\ + 4,800 \quad 60 \times 80 \\ \hline 5,568 \end{array}$$

1**Compare and Complete (continued)****1 Discuss** 

Compare each student's strategy. What is similar? What is different? Which representation makes the most sense to you? Why?

Determine each product using a representation from Problem 1.

 **Show your thinking.**

2 59×36

answer: _____

3 85×72

answer: _____

Is It Reasonable?

Estimate each product and then determine the exact answer. Use your estimate to determine whether your answer is reasonable.

4 51×47



Show your thinking.

estimate: _____

answer: _____

Is It Reasonable? (continued)

Estimate each product and then determine the exact answer. Use your estimate to determine whether your answer is reasonable.

5 64×28

 Show your thinking.

estimate: _____

answer: _____

6 Discuss 

How did you use estimation to help you check the reasonableness of your answers?

Summary 6.08

There are many strategies that can be used to multiply 2 two-digit numbers. It is important to pay attention to the place value of each digit being multiplied to determine the partial products.

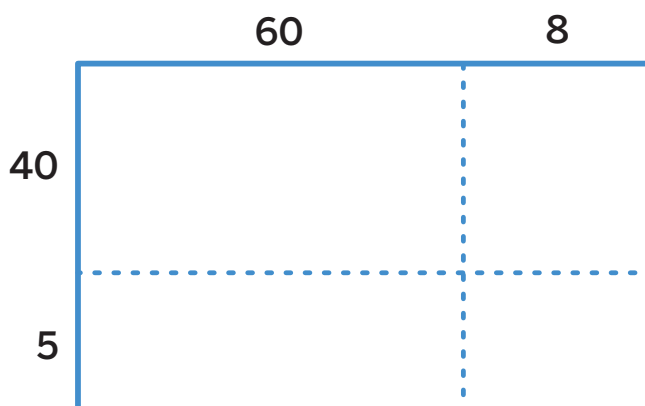
$$32 \times 19$$

Strategies		
	30	2
10	$30 \times 10 = 300$	$2 \times 10 = 20$
9	$30 \times 9 = 270$	$2 \times 9 = 18$
	$300 + 20 + 270 + 18 = 608$	
	$30 \times 10 = 300$ $30 \times 9 = 270$ $2 \times 10 = 20$ $2 \times 9 = 18$ $300 + 270 + 20 + 18 = 608$	$\begin{array}{r} 32 \\ \times 19 \\ \hline 118 \\ 270 \\ 20 \\ \hline 608 \end{array}$ $\begin{array}{l} 9 \times 2 \\ 9 \times 30 \\ 10 \times 2 \\ 10 \times 30 \end{array}$

Practice 6.08

- Complete the area diagram to determine the value of 68×45 .

Show your thinking.



answer: _____

For Problems 2 and 3, use the partial products algorithm to determine the value of the expression.

 **Show your thinking.**

2 92×68


answer: _____

3 61×32

answer: _____

Practice 6.08

Name _____ Date _____

- 4  Determine the product.

$$84 \times 56$$

(A) 5,034

(B) 8,265

(C) 4,704

(D) 3,978

Spiral Review

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

 Show your thinking.

5 $10,473 - 5,064$

6 $6,385 + 1,945$

answer: _____

answer: _____

- 7 Clare kicked a soccer ball 6 yards. Her sister kicked the soccer ball 2 times as far as Clare. How many feet did Clare's sister kick the soccer ball?

 Show your thinking.

answer: _____

How Many Supplies?

Let's solve problems involving multi-digit numbers.



We are a math community.
How can you use the ideas of others to help you learn today in math class?

Warm-Up



eyes on teacher

Activity

1

Supplies for a Workshop

Maile is gathering supplies to make lei for Paul's family members who are coming to Hawai'i. She needs to make lei for 7 adults and 12 children. Use the Activity 1 PDF for the materials and amounts needed to make each lei.

- Determine the amount of each material Maile will need to make 7 adult lei.

Show or explain your thinking.

twine: _____

leaves: _____

flowers petals: _____

1**Supplies for a Workshop (continued)**

- 2** Determine the amount of each material Maile will need to make 12 child lei.

 **Show or explain your thinking.**

twine: _____

leaves: _____

flowers: _____

Summary 6.09

You can use what you know about multiplying with multi-digit numbers to solve real-world problems.

There are 6 baskets with 748 flowers in each basket.
How many total flowers are there?

$$748 \times 6$$

$$700 \times 6 = 4,200$$

$$40 \times 6 = 240$$

$$8 \times 6 = 48$$

$$4,200 + 240 + 48 = 4,488$$

There are 4,488 total flowers.

A garden is 74 inches long and 86 inches wide.
What is the area of the garden?

$$74 \times 86$$

$$6 \times 4 = 24$$

$$6 \times 70 = 420$$

$$80 \times 4 = 320$$

$$80 \times 70 = 5,600$$

$$5,600 + 420 + 320 + 24 = 6,364$$

The area of the garden is 6,364 square inches.

Practice 6.09

- 1  Determine the product $1,743 \times 9$.

 **Show your thinking.**

answer: _____

Practice 6.09

Name _____ Date _____

Use the information for Problems 2–4.

Han is building cowpens on his ranch. He needs to determine the amount of supplies he needs.

Material	Amount for each pen
posts	93 posts
fence nails	1,158 nails
barbed wire	243 rolls

 Show your thinking.

2 How many posts will Han need to build 4 pens?

answer: _____

3 How many fence nails will Han need to build 6 pens?

answer: _____

4 If Han builds 8 pens, how many rolls of barbed wire will he need?

- (A) 744 rolls (B) 1,944 rolls (C) 2,187 rolls (D) 9,264 rolls

Practice 6.09

Name _____ Date _____

- 5 What is the product 542×3 ?
- (A) 1,626 (B) 1,506
- (C) 1,646 (D) 1,526

Spiral Review

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

 Show your thinking.

6 $3,964 + 6,815$

answer: _____

7 $8,545 - 7,638$

answer: _____

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

8 8×10 _____

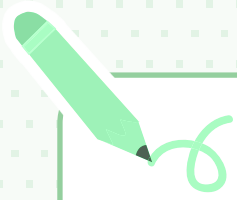
9 9×8 _____

10 6×6 _____

11 $45 \div 5$ _____

12 $36 \div 3$ _____

13 $100 \div 10$ _____



Notes:

Multi-Digit Division

★ Unit Story: Special Day, Special Lei



Number1411/Shutterstock.com

Maile's aunt made lei for an order at Pat's Lei Shop. She needs to pack the lei into boxes for shipping. How can she use division to help her determine how many lei to put in each box?

Lei for a Celebration

Let's interpret and solve division problems.



Warm-Up



eyes on teacher



I can be all of me in math class.

How can you make sure your ideas are shared in math class today?

Activity

1

Orchids for Lei

Hands-On

Maile's aunt needs to make 4 lei for an order placed at Pat's Lei Shop. She gathered 216 orchid flowers for the order.

- 1 Maile's aunt wants to use all the orchids and string the same number of orchids on each lei. How many orchids should she use for each lei?



Show or explain your thinking.

answer: _____

1**Orchids for Lei (continued)****2****Discuss** 

- Explain how you solved the problem.
- Compare your strategy with your partner's strategy. What was similar? What was different?

Celebration Lei

Hands-On

Write an equation to represent each problem, using the letter c for the unknown value. Then solve each problem.

- 3 Maile's mom has 135 feet of twine she can use to make lei for a celebration. If she needs 5 feet of twine to make each lei, how many total lei can she make?

 Show your thinking.

equation: _____

answer: _____

Celebration Lei (continued)

Write an equation to represent each problem, using the letter c for the unknown value. Then solve each problem.

- 4 Maile's sister made 114 lei for a celebration. She put the same number of lei on display at 6 different tables. How many lei did she put on each table?

 Show your thinking.

equation: _____

answer: _____



Summary 6.10

Division situations can be written as multiplication equations. The quotient in a division equation is an unknown factor in the related multiplication equation.

$$\begin{array}{ccccccc} 112 & \div & 4 & = & d & & \\ \text{dividend} & & \text{divisor} & & \text{quotient} & & \end{array}$$

$$\begin{array}{ccccccc} 4 & \times & d & = & 112 & & \\ \text{factor} & & \text{factor} & & \text{product} & & \end{array}$$

Practice 6.10

- 1 Priya harvests 175 tomatoes from her garden. She wants to share them equally with 5 friends. How many tomatoes does each friend get?

 Show or explain your thinking.

answer: _____

For Problems 2–4, write an equation to represent the problem, using the letter c for the unknown value. Then solve the problem.

i Show your thinking.

- 2** Diego had 116 eggs from his 4 chickens. If each chicken laid the same number of eggs, how many eggs did each chicken lay?

equation: _____ answer: _____

- 3** Jada wants to read the same number of pages each day to finish her book in 5 days. She has 150 pages left. How many pages should Jada read each day to finish her book?


equation: _____ answer: _____

- 4** Han divided 224 flowers equally to make 8 lei. How many flowers did Han use for each lei?

equation: _____ answer: _____

Practice 6.10

Name _____ Date _____

- 5  Shawn's flower shop had a big flower delivery. The delivery was for 480 flowers. Shawn divided all the flowers equally between 8 vases. How many flowers did Shawn put in each vase?

(A) 26 flowers (B) 32 flowers (C) 60 flowers (D) 80 flowers

Spiral Review

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

 Show your thinking.

6 $16,784 + 15,296$

answer: _____

7 $52,937 + 18,044$

answer: _____

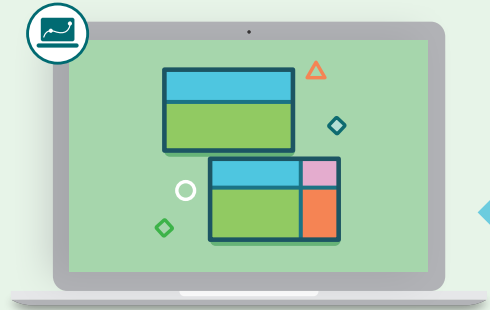
- 8 Clare purchased 2 jars of paint. The first jar held 665 milliliters, and the second jar held 340 milliliters. Did Clare have more or less than 1 liter of paint altogether?

 Show your thinking.

answer: _____

Divide, Decompose, Conquer!

Let's use area models to divide multi-digit numbers.



I am a doer of math.
How can you use your problem solving skills to help you in math class today?

Warm-Up

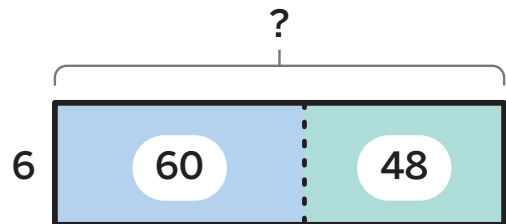
1 eyes on teacher

Activity

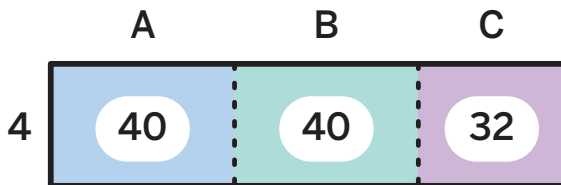
1 Awesome Area

2 Discuss

The rectangle has an area of 108 square units and a width of 6 units. Determine the length of the rectangle. Share your strategy with your partner.



3 The rectangle has an area of 112 square units and a width of 4 units. Use the decomposed area to determine the missing length of each part and the total missing length of the rectangle.

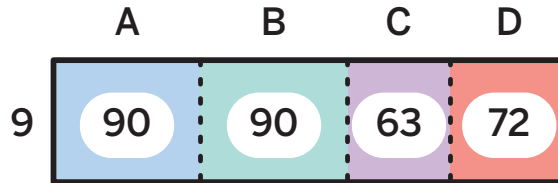


A	
B	
C	
Total length	

1

Awesome Area (continued)

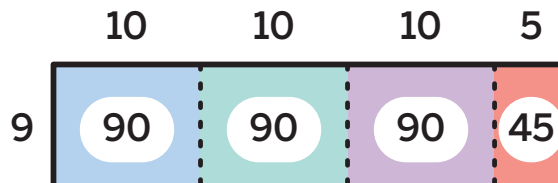
- 4** The rectangle has an area of 315 square units and a width of 9 units. Use the decomposed area to determine the missing length of each part and the total missing length of the rectangle.



A	
B	
C	
D	
Total length	

5 Think-Pair-Share 

Where do you see the dividend represented in the area model?
Where do you see the quotient represented?



Division Details

6

Discuss 

Diego is using an area model to evaluate $273 \div 7$. His first step is shown. Do you agree with Diego's first step? Why or why not?



7-8

Use the area model to evaluate $273 \div 7$. Decompose 273 into parts and determine the partial quotients in order to determine the final quotient.



Show your thinking.



answer: _____

Division Details (continued)

9 Use the area model to evaluate each expression.

i Show your thinking.

$$416 \div 4$$

4



answer: _____

$$372 \div 6$$

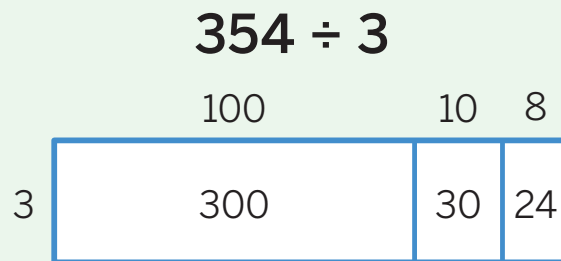
6



answer: _____

Summary 6.11

When you divide, you can decompose the dividend into parts and divide each part by the divisor. Area diagrams can be used to represent how the dividend is decomposed.



$$100 + 10 + 8 = 118$$

$$354 \div 3 = 118$$

partial quotient The value obtained when multiplying the divisor in a division equation by another number, then subtracting that number from the dividend (which is then added to other partial quotients to arrive at the total quotient).

Practice 6.11

- 1 The area diagram represents $132 \div 6$. Complete the diagram to determine the quotient.

Show your thinking.



answer: _____

Practice 6.11

Name _____ Date _____

- 2 Write a division equation to represent the problem, using a letter for the unknown value. Then solve the problem.

Diego tiled a rectangular section of a shower that was 8 tiles wide. He used 128 tiles for the shower. How many tiles long was the area Diego tiled?

 Show or explain your thinking.

equation: _____

answer: _____

- 3 Clare's mom was hanging wallpaper in the dining room. She bought 248 squares of wallpaper. If the wall is 4 squares wide, how many squares long is the dining room?

 Show your thinking.

answer: _____

Practice 6.11

Name _____ Date _____

4 Use an area diagram to evaluate $375 \div 5$.

(A) 15

(B) 60

(C) 65

(D) 75

 Show or explain your thinking.

Spiral Review

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

 Show your thinking.

5 $15,926 - 11,641$

answer: _____

6 $27,462 - 18,375$

answer: _____

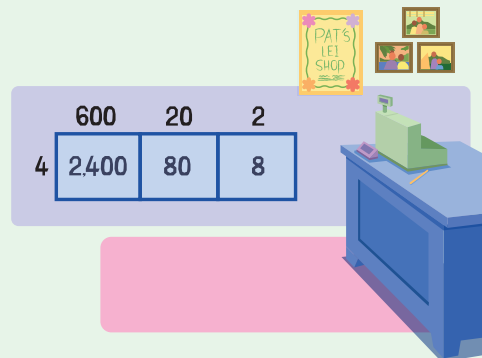
For Problems 7 and 8, determine the value of the expression.

7 $72 \div 9$ _____

8 $48 \div 6$ _____

Different Ways to Record

Let's decompose the dividend to divide.



Warm-Up



eyes on teacher



We are a math community.
How can you work together to solve math problems?

Activity

1

Two Representations

Jada's and Diego's representations for determining the quotient $2,488 \div 4$ are shown. Jada used an area diagram, and Diego used division equations.



Diego

$$2,000 \div 4 = 500$$

$$400 \div 4 = 100$$

$$80 \div 4 = 20$$

$$8 \div 4 = 2$$

1**Two Representations (continued)****1** Discuss 

- How are the representations similar? How are they different?
- How can you use each representation to determine the final quotient?

Determine each quotient.

 Show your thinking.

2 $432 \div 8$

answer: _____

3 $267 \div 3$

answer: _____

Using Partial Quotients

Determine each quotient.

 Show your thinking.

4 $2,514 \div 3$

answer: _____



Using Partial Quotients (continued)

Determine each quotient.

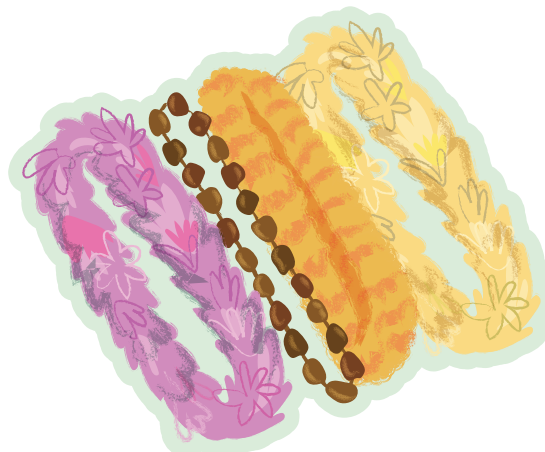
i Show your thinking.

5 $1,765 \div 5$

answer: _____

6 Discuss 

- Compare your partial quotients with a partner. What is similar? What is different?
- How did you know when you did not need to divide anymore?



Summary 6.12

Area diagrams and equations can be used to represent partial quotients that result from decomposing the dividend into parts and dividing each part by the divisor. The final quotient is determined by adding the partial quotients.

$$\begin{array}{c} \mathbf{3,235 \div 5} \\ (3,000 + 200 + 35) \div 5 \end{array}$$

partial quotients			
↓	↓	↓	
600	40	7	
5	3,000	200	35

$$\begin{array}{l} 3,000 \div 5 = 600 \\ 200 \div 5 = 40 \\ 35 \div 5 = 7 \end{array} \quad \left. \vphantom{\begin{array}{l} 3,000 \div 5 = 600 \\ 200 \div 5 = 40 \\ 35 \div 5 = 7 \end{array}} \right\} \text{partial quotients}$$

$$\begin{array}{l} 600 + 40 + 7 = 647 \\ 3,235 \div 5 = 647 \end{array}$$

Practice 6.12

- Shawn's family is driving to the Grand Canyon, which is 892 miles away. They want to drive the same number of miles each day and get there in 4 days. How many miles should the family drive each day?

 Show your thinking.

answer: _____

For Problems 2–4, determine the quotient.



Show your thinking.

2

$486 \div 6$

answer: _____

3

$1,150 \div 5$

answer: _____


4

$1,862 \div 2$

answer: _____

Practice 6.12

Name _____ Date _____

- 5  Jada has 2,842 marbles. She equally divides the marbles into 7 boxes. How many marbles are in each box?

- (A) 70 marbles (B) 400 marbles
(C) 406 marbles (D) 442 marbles

 Show or explain your thinking.

Spiral Review

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

 Show your thinking.

6 $34,748 + 16,134$

7 $43,074 + 9,187$

answer: _____

answer: _____

- 8 It takes a dog groomer $\frac{4}{6}$ hours to wash and dry 1 dog. How long will it take the dog groomer to wash and dry 5 dogs?

 Show your thinking.

answer: _____

Lei Shop Orders

Let's explore different ways to determine a quotient.



Warm-Up



eyes on teacher



I am a doer of math.

What makes you excited about math?

Activity

1

What's the Next Step?

1 Here are 4 possible first steps for evaluating the expression $512 \div 8$.

8×10

$480 \div 8$

8×60

$80 \div 8$

Evaluate the expression $512 \div 8$ using one of the first steps shown.



Show your thinking.

answer: _____

1**What's the Next Step? (continued)****2****Discuss** 

In your group, compare your methods for evaluating the expression $512 \div 8$.

- What is similar? What is different?
- Where do you see the final quotient in each method?

Lei Orders

Use any strategy to determine each quotient.

i Show your thinking.

- 3** Pat's Lei Shop ordered 1,317 flowers for making lei. If the flowers are equally divided into 3 groups, how many flowers will be in each group?

answer: _____



Lei Orders (continued)

Use any strategy to determine each quotient.



Show your thinking.

- 4 Pat's Lei Shop has 456 lei that need to be equally divided into 6 boxes for shipping. How many lei will be placed in each box?

answer: _____

- 5 Pat's Lei Shop has 1,524 wristlets for a celebration that need to be equally divided into 4 boxes. How many wristlets will be placed in each box?

answer: _____

Summary 6.13

Dividends can be decomposed into different combinations and numbers of addends to solve division problems using known division or multiplication facts.

$$472 \div 8$$

$$472 = 400 + 72$$

$$400 \div 8 = 50$$

$$72 \div 8 = 9$$

$$50 + 9 = 59$$

$$472 \div 8 = 59$$

$$472 = 400 + 72$$

$$8 \times 50 = 400$$

$$8 \times 9 = 72$$

$$50 + 9 = 59$$

$$472 \div 8 = 59$$

Practice 6.13

- 1 Han has 1,484 trading cards. He equally divides his trading cards into 4 bins. How many cards does he put in each bin?

 Show your thinking.

answer: _____

For Problems 2 and 3, use any strategy to determine the quotient.



Show your thinking.

- 2** Jada has 144 eggs. She equally divides the eggs into 6 boxes. How many eggs are in each box?


answer: _____

- 3** Priya orders 2,375 flowers. She equally places all the flowers in 5 large vases for a wedding. How many flowers are in each vase?

answer: _____

Practice 6.13

Name _____ Date _____

- 4  A group of 864 students are going to a history museum. They will be divided into 8 equal groups. How many students will be in each group?

- (A) 115 students (B) 106 students
(C) 108 students (D) 103 students

 Show or explain your thinking.

Spiral Review

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

 Show your thinking.

5 $24,385 - 12,457$

answer: _____

6 $19,889 - 6,791$

answer: _____

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

7 6×7 _____

8 $56 \div 7$ _____

9 $54 \div 9$ _____

10 8×9 _____

Envision the Division

Let's look at ways to divide with partial quotients.



$$465 \div 5$$

$$400 \div 5 = 80$$

$$60 \div 5 = 12$$

$$5 \div 5 = 1$$



I can be all of me in math class.

How do your actions show that you are a mathematician?

Warm-Up



eyes on teacher

Activity

1

Two Ways

Priya and Diego determined the value of $465 \div 5$. Their work is shown.

Priya's work

$$400 \div 5 = 80$$

$$60 \div 5 = 12$$

$$5 \div 5 = 1$$

$$80 + 12 + 1 = 93$$

Diego's work

$$\begin{array}{r}
 5 \overline{)465} \\
 \underline{-400} \quad 5 \times 80 \\
 65 \\
 \underline{-60} \quad 5 \times 12 \\
 5 \\
 \underline{-5} \quad 5 \times 1 \\
 0
 \end{array}
 \left. \vphantom{\begin{array}{r} 5 \overline{)465} \\ \underline{-400} \\ 65 \\ \underline{-60} \\ 5 \\ \underline{-5} \\ 0 \end{array}} \right] 93$$

1 Discuss

How is Priya's work similar to Diego's work? How is it different?

1**Two Ways (continued)**

- 2** Determine the quotient using Diego's method.

$$228 \div 4$$



Show your thinking.

answer: _____

- 3** Determine the quotient using any strategy.

$$3,372 \div 6$$



Show your thinking.

answer: _____

Summary 6.14

There are different ways to record partial quotients when dividing multi-digit numbers.

$$645 \div 5$$

$$\begin{array}{r} 5 \overline{)645} \\ -500 \\ \hline 145 \\ -100 \\ \hline 45 \\ -45 \\ \hline 0 \end{array} \quad \left. \begin{array}{l} 5 \times 100 \\ 5 \times 20 \\ 5 \times 9 \end{array} \right\} 129$$

$$\begin{array}{l} 500 \div 5 = 100 \\ 100 \div 5 = 20 \\ 45 \div 5 = 9 \\ 100 + 20 + 9 = 129 \end{array}$$

Practice 6.14

For Problems 1–3, determine the quotient using any strategy.



Show your thinking.

1 $424 \div 4$

answer: _____



Show your thinking.

2

$573 \div 3$

answer: _____

3

$3,648 \div 6$

answer: _____

4

What is the value of $4,509 \div 9$?

(A)

501

(B)

513

(C)

523

(D)

592



Show or explain your thinking.

Spiral Review

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

 Show your thinking.

5 $34,456 + 6,705$

answer: _____

6 $46,790 + 23,247$

answer: _____

- 7 A soup recipe includes chicken and carrots. Han uses 3 pounds of chicken. The weight of the chicken is 3 times the weight of the carrots that Han needs. How many ounces of carrots does Han need?

 Show or explain your thinking.

answer: _____

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

8 9×9 _____

9 5×8 _____

10 $88 \div 11$ _____

11 $42 \div 7$ _____

Boxes for Lei

Let's estimate and divide to determine quotients.



I am a doer of math.

What new ideas can you use today in math class to help you problem solve?

Warm-Up



eyes on teacher

Activity

1

Packing Lei

Maile needs estimates for the number of flowers that will fit in each box. Determine an estimate for each problem.



Show your thinking.

1

Maile needs to pack 392 purple orchids into 7 boxes. About how many purple orchids will fit in each box?

estimate: _____

1**Packing Lei (continued)**

Determine an estimate for each problem.



Show your thinking.

2

Maile needs to pack 732 white orchids into 3 boxes. About how many white orchids will fit in each box?

estimate: _____

3

Maile needs to pack 2,315 yellow orchids into 5 boxes. About how many yellow orchids will fit in each box?

estimate: _____

Estimate and Divide

Estimate each quotient and then determine the exact answer.
Use your estimate to check the reasonableness of your exact answer.

4 $530 \div 5$



Show your thinking.

estimate: _____

answer: _____

Estimate and Divide (continued)

Estimate each quotient and then determine the exact answer.
Use your estimate to check the reasonableness of your exact answer.

5 $4,284 \div 7$

 Show your thinking.

estimate: _____

answer: _____

6 **Discuss** 

How did you use your estimate to check the reasonableness of your answer?

Summary 6.15

Estimation can help you check your answers for reasonableness when dividing.

$$\begin{array}{l} 412 \div 4 \\ 400 \div 4 = 100 \\ \text{So, } 412 \div 4 \text{ is about } 100. \end{array}$$

$$\begin{array}{r} 412 \div 4 \\ \hline 4 \overline{) 412} \\ \underline{- 400} \quad 4 \times 100 \\ 12 \\ \underline{- 12} \quad 4 \times 3 \\ 0 \end{array} \quad \left. \vphantom{\begin{array}{r} 412 \div 4 \\ \hline 4 \overline{) 412} \\ \underline{- 400} \\ 12 \\ \underline{- 12} \\ 0 \end{array}} \right] 103$$
$$412 \div 4 = 103$$

100 is a reasonable estimate.

Practice 6.15

- 1 Use estimation to determine whether Clare's answer is reasonable. Write *yes* or *no*.

Clare has 220 raffle tickets to sell. Each ticket book contains 5 tickets. Clare says she needs to sell about 40 books. Is this reasonable?

 **Show your thinking.**

answer: _____

For Problems 2 and 3, estimate the quotient and then determine the exact answer.



Show your thinking.


2 $432 \div 4$

estimate: _____ answer: _____

3 $6,270 \div 3$

estimate: _____ answer: _____

4

 There are about 330 people in 4 train cars. If there are about the same number of people in each train car, how many people could be in each train car?

- (A) 40 people (B) 60 people (C) 80 people (D) 95 people

Spiral Review

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

 Show your thinking.

5 $10,892 + 4,736$

answer: _____

6 $7,472 - 3,048$

answer: _____

- 7 Clare spent $\frac{3}{4}$ hours knitting every day for 4 days. What was the total number of hours Clare knitted for the 4 days?

 Show your thinking.

answer: _____

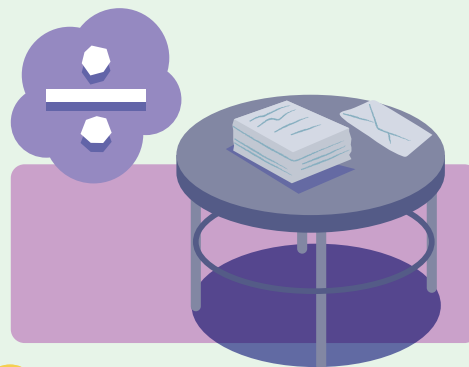
For Problems 8 and 9, determine the value of the expression.

8 $28 \div 7$ _____

9 $50 \div 5$ _____

Lei Shop Problems

Let's create and solve division story problems.



I am a doer of math.

Pat's Lei Shop was successful when they helped their customers. What helps you feel successful in math class?

Warm-Up



eyes on teacher

Activity

1

Creating Your Own Lei Shop Problems

Work with your partner to create 2 division story problems for another pair to solve. Choose 1 dividend, 1 divisor, 1 person, and 1 object from the table. You may use each dividend, divisor, person, and object only once.

Dividends	Divisors	People	Objects
3,576	6	Maile	orchids
594	3	Arlene	boxes
2,634	2	Paul	string

1 Story problem 1

1**Creating Your Own Lei Shop Problems (continued)****2** Story problem 2

3 Write an equation to represent Problem 1 from another pair. Then solve the problem.**i Show your thinking.**

equation: _____

answer: _____

4 Write an equation to represent Problem 2 from the same pair. Then solve the problem.**i Show your thinking.**

equation: _____

answer: _____

Summary 6.16

When creating division story problems that involve determining a quotient, you must have a dividend and a divisor. You can solve the problems using any strategy.

$$428 \div 4$$

Strategies		
$4 \times 100 = 400$	$400 \div 4 = 100$	$\begin{array}{r} 4 \overline{)428} \\ -400 \\ \hline 28 \\ -28 \\ \hline 0 \end{array} \quad \left. \begin{array}{l} 4 \times 100 \\ 4 \times 7 \end{array} \right\} 107$
$4 \times 7 = 28$	$28 \div 4 = 7$	
$100 + 7 = 107$	$100 + 7 = 107$	

Practice 6.16

- 1 Create a division story problem that could be solved using $2,840 \div 4$.

Practice 6.16

Name _____ Date _____

For Problems 2 and 3, choose 1 dividend, 1 divisor, 1 person, and 1 object from the table.

Dividends	Divisors	People	Objects
1,680	4	Han	pansies
760	2	Clare	boxes

- 2 Using the dividend, divisor, person, and object you chose, create a division story problem.


- 3 Solve your problem.

 Show your thinking.

answer: _____

Practice 6.16

Name _____ Date _____

- 4  Jada ordered 2,384 clay beads. She equally divided the clay beads into 8 containers. How many clay beads did she put in each container?
- (A) 296 beads (B) 298 beads
- (C) 300 beads (D) 398 beads

Spiral Review

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

 Show your thinking.

5 $5,076 + 6,447$

answer: _____

6 $2,985 + 7,981$

answer: _____

For Problems 7–9, complete the comparison statement using $<$, $>$, or $=$.

7 3 hours _____ 180 minutes

8 $4\frac{1}{2}$ hours _____ 280 minutes

9 $1\frac{1}{2}$ hours _____ 80 minutes

Remainders and Problem Solving

✦ Unit Story: Special Day, Special Lei



Andrii Zastrozhnov/Shutterstock.com

When Maile and her family are packing up lei to be shipped, they sometimes have boxes that are not completely filled. What do you have to consider when you divide and end up with a remainder?

Shipping Lei

Let's interpret and solve division problems.



I can be all of me in math class.
How can you use your past experiences to help you in math class today?

Warm-Up



eyes on teacher

Activity

1

Packing and Storing

Hands-On

Pat's Lei Shop has some materials for making lei that need to be organized and stored in the cooler. Maile offered to help sort the materials and place them into containers for storage.

- 1 Maile has 110 orchids that she wants to sort into 5 groups of equal size. How many orchids can she put in each group?



Show or explain your thinking.

answer: _____

1**Packing and Storing (continued)**

- 2** Maile has 110 carnations that she wants to sort into 4 groups of equal size. How many carnations can she put in each group?

 **Show or explain your thinking.**

answer: _____

- 3** **Discuss** 

What was similar about Problems 1 and 2? What was different?

- 4** Maile has 152 ti leaves that need to be sorted into groups and placed in storage bags. Because the ti leaves are large, Maile wants to package them in groups of 5. How many groups of ti leaves can Maile make?

 **Show or explain your thinking.**

answer: _____

Packing and Shipping

5 Two workers at Pat's Lei Shop are packing an order of 378 lei into boxes for shipping. The boxes can hold up to 4 lei.

- The first worker says they will need 94 boxes to pack all the lei.
- The second worker says 95 boxes are needed for packing the order.

Who do you agree with?



Show or explain your thinking.

answer: _____

Packing and Shipping (continued)

6

Discuss 

- How did you determine what to do about the remainder in Problem 5?
- How is this similar to or different from what you did with the remainder in Problems 2 and 4 in Activity 1?

Summary 6.17

When dividing numbers, any amount left is called a **remainder**. The problem and the context will help you determine what to do with the remainder.

Maile is packing 294 lei into boxes. Each box can hold up to 4 lei.
How many boxes are needed to pack all the lei?

$$294 \div 4$$

$$280 \div 4 = 70$$

$$12 \div 4 = 3$$

$$280 + 12 = 292$$

$$294 - 292 = 2$$

294 divided by 4 is 73 with a remainder of 2.

Maile needs 74 boxes to fit all the lei.

remainder The amount leftover when another whole group of the divisor cannot be made when dividing. The remainder is less than the divisor.

Practice 6.17

- 1 An order has 483 lei that need to be packaged and shipped. If 5 lei can fit in each box, how many boxes are needed to package and ship all the lei?

 Show or explain your thinking.

answer: _____

- 2** Jada and 3 friends sold bracelets and earned \$461. If they split their earnings equally, how much money did they each make?

 **Show or explain your thinking.**

answer: _____

- 3** Some students are boxing up 342 cans of food. The boxes can hold up to 8 cans.

Diego says they will need 42 boxes to pack all the cans of food.

Clare says 43 boxes are needed to pack all the cans of food.


Who do you agree with?

 **Show or explain your thinking.**

answer: _____

Practice 6.17

Name _____ Date _____

- 4  A florist has 142 daisies that she wants to sort into 6 groups of equal size. How many daisies can she put in each group?
- (A) 23 daisies (B) 24 daisies
- (C) 25 daisies (D) 26 daisies

Spiral Review

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

 Show your thinking.

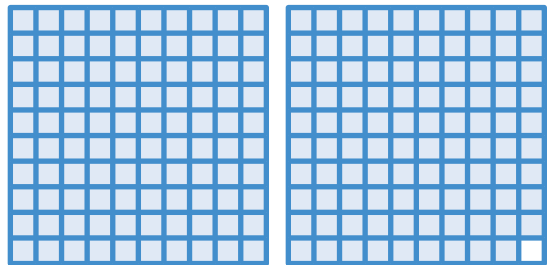
5 $11,667 - 1,518$

answer: _____

6 $12,249 + 13,627$

answer: _____

- 7 Each large square represents 1 whole. Write a fraction and a decimal to represent the diagram.



fraction: _____

decimal: _____

Leftover Players

Let's solve division problems and make sense of the remainders.



Warm-Up



eyes on teacher



I am a doer of math.

What ways can you be flexible in math class today?

Activity

1

How Many Teams?

The table shows the number of students in each school district who signed up to participate in a basketball league. Every student who signed up will be placed on a team in their school district.

The basketball league wants to place 9 players on each team. Any players leftover will be added to the teams, so some teams will have 10 players.

School district	Number of players	Number of 9-player teams	Number of 10-player teams
Central	298		
Eastern	327		
Western	151		

1

Discuss

- How could you estimate the number of teams for each school district?
- How could you determine the exact number of 9-player and 10-player teams for each school district?

1**How Many Teams? (continued)**

For each school district, determine how many teams will have 9 players and how many teams will have 10 players. Complete the table with the appropriate values. Talk with your group about how the remainder can be interpreted to determine the numbers of 9-player and 10-player teams.



Show your thinking.

2

Central School District

3

Eastern School District

4

Western School District

Summary 6.18

The final answer to a division problem with a remainder depends on how the remainder needs to be interpreted to solve the problem. For some problems, you may need to distribute the remainder.

There are 293 players signed up for a basketball league. The league wants to place 7 players on each team and distribute any leftover players to make some 8-player teams. Determine the number of 7- and 8-player teams.

$$293 \div 7$$

$$293 \div 7 \text{ is } 41 \text{ with a remainder of } 6.$$

$$7 \times 40 = 280$$

$$7 \times 1 = 7$$

$$7 \times 41 = 287$$

41 teams with 6 left

35 teams will have 7 players.

6 teams will have 8 players.

$$293 - 287 = 6$$

Practice 6.18

- 1** A basketball league has 178 basketball players. Each team will have 8 players. Any players left will be added to the teams, so some teams will have 9 players. Determine how many teams will have 8 players and how many teams will have 9 players.

 **Show your thinking.**

answer: _____

- 2** A community center has 145 students registered for art classes. The center wants to place 6 students in each class. Any students remaining will be added to the classes, so some classes will have 7 students. Determine how many classes will have 6 students and how many classes will have 7 students.

 **Show your thinking.**

answer: _____



- 3** A florist has 383 roses. She wants to put 9 roses in each vase. Any roses left will be added to the vases, so some vases will have 10 roses. Determine how many vases will have 9 roses and how many vases will have 10 roses.

 **Show your thinking.**

answer: _____

Practice 6.18

Name _____ Date _____

- 4  A preschool teacher ordered 180 markers. She wants each bin to have 7 markers. Any markers left will be added to the bins, so some bins will have 8 markers. How many bins will have 8 markers?
- (A) 25 bins (B) 26 bins
(C) 5 bins (D) 4 bins
- 5  A 3-on-3 basketball tournament has 211 players. Each team will have 5 players. Any players left will be added to the teams, so some teams will have 6 players. How many teams will have only 5 players?
- (A) 2 teams (B) 41 teams
(C) 3 teams (D) 42 teams

Spiral Review

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

 Show your thinking.

6 $2,286 + 6,722$

answer: _____

7 $5,440 - 2,531$

answer: _____

For Problems 8 and 9, determine the value of the expression.

8 7×5 _____


9 $54 \div 6$ _____

Field Trip Frenzy

Let's make sense of and solve story problems.



Warm-Up

1  eyes on teacher

We are a math community.
How could you build on the ideas of others to help you today?

Activity

1 Division Decisions

2 Maile's school is taking 135 students on a field trip. One option is to use vans that fit 15 students. What is the fewest number of vans needed?

 **Show or explain your thinking.**

answer: _____

1**Division Decisions (continued)**

- 3** Another option is to use buses that fit 25 students. What is the fewest number of buses needed to transport 135 students?

 **Show or explain your thinking.**

answer: _____

- 4** **Discuss** 

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

Remainder Road

- 5** Grade 4 has 168 students. The school has chosen buses that fit 40 students each. What is the fewest number of buses needed?

 Show or explain your thinking.

answer: _____

- 6** Grade 5 has 142 students. The school has chosen buses that fit 40 students each. What is the fewest number of buses needed?

 Show or explain your thinking.

answer: _____

Remainder Road (continued)

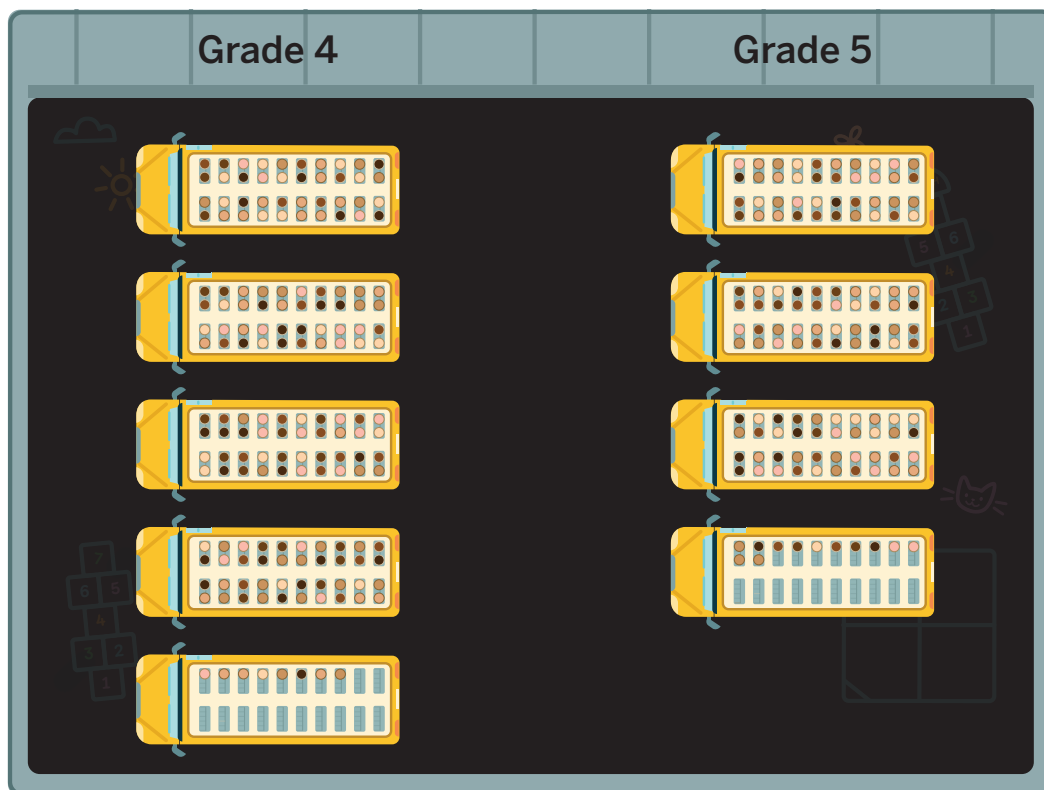
7

Explain 

The school has chosen buses that fit 40 students each.

- Grade 4 has 168 students
- Grade 5 has 142 students.

How many buses are needed if both grades travel together?



Summary 6.19

When interpreting story problems that involve equal groups, the context helps you determine what each value represents.

112 students will travel in vans for a field trip. The vans can fit 9 students. What is the fewest number of vans needed?

$$\begin{array}{r} 9 \overline{)112} \\ - 90 \\ \hline 22 \\ - 18 \\ \hline 4 \end{array} \quad \left. \begin{array}{l} 9 \times 10 \\ 9 \times 2 \end{array} \right\} 12$$

12 vans would not fit everyone because there would be 4 students left. 13 vans are needed to fit all the students.

Practice 6.19

Use the situation for Problems 1–3.

All the fourth-grade teachers and students are receiving a school hat. The school needs 334 hats. Company A sells 24 hats in a package. Company B sells 40 hats in a package.

- 1 What is the *least* number of packages needed from Company A?

 Show your thinking.

answer: _____

- 2 What is the *least* number of packages needed from Company B?

i Show your thinking.

answer: _____


- 3 Company C sells larger packages of hats, each containing 70 hats. A student says, "If the school chooses Company C, it will need only 5 packages but will have the most leftover hats." Do you agree with the student? Write *yes* or *no*.

i Show or explain your thinking.

answer: _____

Practice 6.19

Name _____ Date _____

- 4  A party planner needs 368 balloons. Company A sells 48 balloons in a package. Company B sells 70 balloons in a package. What is the *least* number of packages needed from Company A?
- (A) 5 packages (B) 6 packages
(C) 7 packages (D) 8 packages

Spiral Review

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

 Show your thinking.

5 $9,465 - 3,537$

answer: _____

6 $6,704 + 8,925$

answer: _____

- 7 Clare needs 2 liters of lemonade. She has 2 bottles of lemonade. The first bottle has 850 millimeters, and the second has 900 millimeters. Does she have enough lemonade?

 Show your thinking.

answer: _____

Shipping Supplies

Let's reason about and solve multi-step problems.



Warm-Up



eyes on teacher



We are a math community.

How and when do you use math outside of the classroom?

Activity

1

Shipping Supplies

- 1 Cooling packets used for shipping lei are \$9 each. Pat's Lei Shop purchased the same number of packets 2 years in a row. They spent \$3,132 on cooling packets the first year. How many total cooling packets did they purchase over the 2 years?



Show your thinking.

answer: _____

1**Shipping Supplies (continued)**

- 2** Last year, Pat's Lei Shop purchased enough packing supplies for 497 boxes. Each box cost \$7, and packing supplies for each box cost \$5. How much money did Pat's Lei Shop spend on the boxes and packing supplies last year?

**Show your thinking.**

answer: _____

- 3** Pat's Lei Shop has \$900 to cover the cost of shipping 45 boxes of lei. The cost for shipping each box is \$18.
- Does the shop have enough money to cover the shipping costs for 45 boxes?
 - If they do, how much money will they have leftover after shipping? If they do not, how much more money is needed?

**Show your thinking.**

answer: _____

Summary 6.20

A variety of strategies can be used when solving real-world problems that require more than 1 step.

Pat's Lei Shop needs to ship 45 boxes of lei. Each box needs 3 cooling packets, and each cooling packet costs \$9. How much will the shop spend on cooling packets?

$$45 \times 3$$

$$40 \times 3 = 120$$

$$5 \times 3 = 15$$

$$120 + 15 = 135$$

$$135 \times 9$$

$$(100 \times 9) + (30 \times 9) + (5 \times 9)$$

$$900 + 270 + 45 = 1,215$$

They need 135 cooling packets.

Pat's Lei Shop will spend \$1,215 on cooling packets.

Practice 6.20

- 1 A soccer league orders shirts and shorts for 525 players. Each shirt costs \$5, and each pair of shorts costs \$3. If each player receives 1 shirt and 1 pair of shorts, what is the total cost of the shirts and shorts?

 Show your thinking.

answer: _____

- 2** A recreation center purchased the same number of towels for 3 years in a row. They spent \$2,646 on towels in the first year. If each towel costs \$6, how many towels were purchased in 3 years?

 **Show your thinking.**

answer: _____


- 3** A principal is ordering 64 boxed lunches. Each boxed lunch costs \$12. The principal has \$800 to cover the cost of the lunches. Will this be enough to cover the cost of the lunches? If yes, how much money is leftover? If not, how much more money is needed?

 **Show your thinking.**

answer: _____

Practice 6.20

Name _____ Date _____

- 4  An art teacher orders a paint set and canvas for 375 students. Each paint set costs \$6, and each canvas costs \$3. Each student will receive 1 paint set and 1 canvas. What is the total cost of the paint sets and canvases?

- (A) \$2,250 (B) \$3,000
(C) \$3,375 (D) \$3,357

Spiral Review

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

 Show your thinking.

5 $10,608 - 9,054$

answer: _____

6 $4,688 + 4,152$

answer: _____

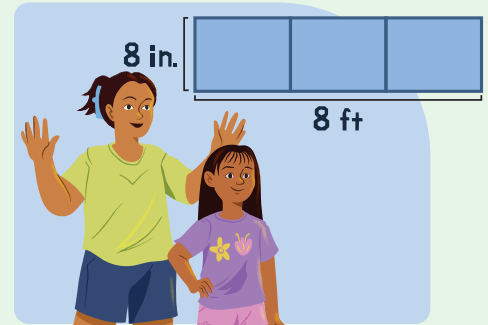
- 7 Han spent $\frac{1}{2}$ hours playing the piano every day for 5 days. How many hours did Han spend playing the piano for the 5 days?

 Show your thinking.

answer: _____

Celebration Banner

Let's solve problems involving perimeter and area.



I am a doer of math.
How might it help when someone shares a mathematical idea even if they are not sure that it will work?

Warm-Up



eyes on teacher

Activity

1

Creating a Banner

Maile wants to make a birthday celebration banner measuring 8 inches high and 8 feet wide.

- Maile bought a sheet of poster board that measures 24 inches by 36 inches. Does Maile have enough poster board to make the banner?

Show or explain your thinking.

answer: _____

1**Creating a Banner (continued)**

- 2** Maile wants to add a border of tissue paper around the perimeter of the banner. What length of tissue paper, in inches, would she need for the border?

 **Show or explain your thinking.**

answer: _____

- 3** **Discuss** 

Compare the strategies you used for each problem. What was similar? What was different?

- 4** **Discuss** 

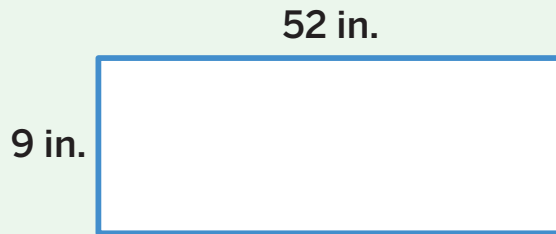
Are your answers for Problems 1 and 2 reasonable? How do you know?

Summary 6.21

Formulas for area and perimeter can be used to solve real-world problems.

Maile used a piece of paper that is 52 inches by 9 inches to create a banner. What is the area of the banner?

Maile wants to add ribbon as a border to the banner. What length of ribbon would she need?



$$\begin{aligned} \text{Area} &= \ell \times w \\ 9 \times 52 &= 468 \text{ sq. in.} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 2 \times (\ell + w) \\ 9 \times (9 + 52) \\ 9 \times 61 &= 122 \text{ in.} \end{aligned}$$

Practice 6.21

- 1 Jada wants to build a wood fence around her rectangular garden. The garden measures 3 yards wide and 20 feet long. How much wood fencing, in feet, will she need?

 **Show your thinking.**

answer: _____

Use the information for Problems 2 and 3.

Diego wants to make a flag measuring 10 inches wide and 4 feet long.

- 2 Diego has a piece of material that measures 30 inches wide and 18 inches long. Does he have enough material to make the flag?

 **Show your thinking.**

answer: _____


- 3 Diego wants to add a checkerboard material around the perimeter of the flag. How much checkerboard material, in inches, will he need?

 **Show your thinking.**

answer: _____

Practice 6.21

Name _____ Date _____

- 4  Clare wants to cover an area of her bedroom floor with floor tiles. The area of her floor measures 8 feet by 60 inches. Each floor tile measures 2 feet by 2 feet. How many floor tiles does Clare need to cover her floor?

(A) 10 tiles (C) 20 tiles (B) 100 tiles (D) 120 tiles

Spiral Review

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

 Show your thinking.

5 $7,654 + 4,750$

answer: _____

6 $8,921 - 6,330$

answer: _____

- 7 Diego used $\frac{1}{4}$ teaspoons of cinnamon per batch of muffins. He made 5 batches of muffins. How many teaspoons of cinnamon did Diego use to make all the batches of muffins?

 Show your thinking.

answer: _____

Large Lei Orders

Let's solve real-world problems with multiple steps.



I can be all of me in math class.

How can you bring your own perspective into the activity today?

Warm-Up



eyes on teacher

Activity

1

More Lei, More Problems

Solve the problems using any strategy. Explain and compare your strategies with your partner.

- Maile and her cousin are determining the length of twine needed to make 83 lei bracelets and 79 lei necklaces for a celebration. They need 8 inches of twine for each lei bracelet and 17 inches of twine for each lei necklace. How many total inches of twine do they need?



Show your thinking.

answer: _____

1**More Lei, More Problems (continued)**

Solve the problems using any strategy. Explain and compare your strategies with your partner.

- 2** Pat's Lei Shop has 2,864 orchids. They use 1,720 orchids for 1 lei order. The remaining orchids need to be equally divided into 8 storage containers. How many orchids should be placed in each container?

i Show your thinking. _____

answer: _____

- 3** Pat's Lei Shop needs to pack boxes for 2 orders of lei. Each box can hold up to 7 lei. The first order has 189 lei, and the second order has 227 lei. How many boxes will they need for both orders of lei?

i Show your thinking. _____

answer: _____

Summary 6.22

Multi-step problems can be solved and represented in different ways.

Movie tickets are \$9 each. A movie theater sold the same number of tickets 2 days in a row. If the theater made a total of \$9,414 from ticket sales, how many tickets did they sell each day?

First way	Second way	Third way
$9,414 \div 2 = 4,707$ $4,707 \div 9 = 523$	$9,414 \div 9 = 1,046$ $1,046 \div 2 = 523$	$(9,414 \div 2) \div 9 = 523$

523 tickets were sold each day.

Practice 6.22

For Problems 1–3, solve the problem using any strategy.

- 1 Clare and her sister are calculating the number of beads they need to make 92 bracelets and 68 necklaces for a craft show. They need 6 beads for each bracelet and 14 beads for each necklace. How many beads do they need in all?

 Show your thinking.

answer: _____

Practice 6.22

Name _____ Date _____

- 2 A bakery makes 400 fresh loaves of bread each day of the week. Of the loaves of bread made in the week, 1,324 were multigrain and the rest were wheat. How many loaves of wheat bread were made in the week?

 Show your thinking.

answer: _____


- 3 A school has 2,468 shirts to sell for a fundraiser. They sell 1,984 shirts. The remaining shirts are divided equally into 4 boxes. How many shirts are placed in each box?

 Show your thinking.

answer: _____

Practice 6.22

Name _____ Date _____

- 4  Jada has 248 clay beads. Her sister has 175 clay beads. They want to combine their beads and make bracelets. Each bracelet needs 9 clay beads. If they use all their clay beads, how many bracelets can they make?

- (A) 27 bracelets (B) 47 bracelets
(C) 28 bracelets (D) 48 bracelets

Spiral Review

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

 Show your thinking.

5 $18,407 - 7,805$

answer: _____

6 $4,312 + 2,778$

answer: _____

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

7 7×7 _____

8 4×9 _____

9 $20 \div 4$ _____

10 $36 \div 6$ _____

11 $99 \div 11$ _____

12 $63 \div 9$ _____

Math at Work

Sarah Breedlove, also known as Madam CJ Walker, was born in 1867 and became the first woman to be recorded as a self-made millionaire in the United States. She started her own line of beauty products specifically made for Black women. Sarah Breedlove also trained other women in how to grow their own businesses.

Small business owners plan, organize, and manage the day-to-day operations of their business. They might multiply or divide with larger numbers to determine how much packaging or shipping might cost as they ship products to customers.



Scurlock Studio (Washington, D.C.) (photographers). - Smithsonian Institution, National Museum of American History/Public Domain. Natalia Melnychuk/Shutterstock.com.

Math in the World

A store needs to pack boxes of honey for 2 orders, one for 205 jars and one for 310 jars. Each box can hold 8 jars. How many boxes will they need?



kobeza/Shutterstock.com.

Math Mindset

When solving the Math in the World problem, how did you know what to do with the remainder?



Unit 7

Angles and Properties of Shapes

Big Ideas in This Unit

- CC2 Number and Shape Patterns
- CC3 Circles, Fractions and Decimals
- CC4 Connected Problem Solving
- Shapes and Symmetries

Questions for Investigation

- What components can be used to describe all the elements of any geometric drawing?
- How can the sizes of angles be compared?
- What attributes must a parallelogram have, and what other attributes can a parallelogram have?



Explore: Draw It

Do you see what I see?



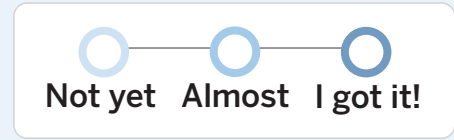
Unit Story: Captain Bogwart's Treasure

In this story, Kayla is on the hunt for Captain Bogwart's treasure. She will use a map and clues to help her get close!



Watch Your Knowledge Grow

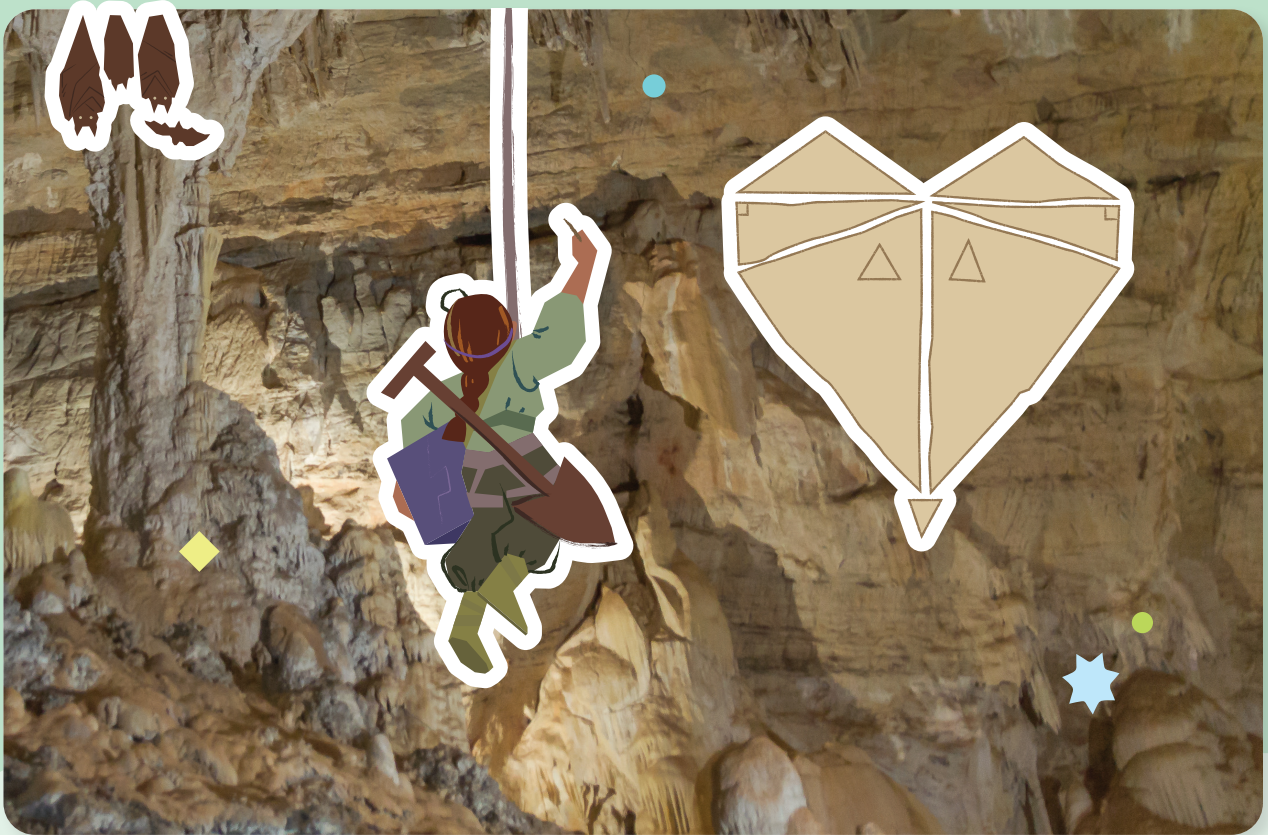
This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



I can . . .	Before	After
Identify and draw points, lines, line segments, and rays in geometric figures.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Identify and draw parallel, perpendicular, and intersecting lines.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Use a protractor to determine the size of angles in degrees.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Measure and identify angles as acute, right, obtuse, or straight.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Draw angles with specific measurements.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Compose and decompose angles to determine unknown angle measurements.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Identify, describe, and draw acute, right, and obtuse triangles.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Identify, describe, and draw equilateral, isosceles, and scalene triangles.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Describe and identify quadrilaterals based on the sides, the size of their angles, and the presence of parallel sides.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Identify, describe, and draw lines of symmetry for two-dimensional figures.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>
Use symmetry to complete drawings of line-symmetric figures and determine unknown angle measurements.	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>	<input type="radio"/> — <input type="radio"/> — <input type="radio"/>

Points, Lines, Segments, and Rays

✦ Unit Story: Captain Bogwart's Treasure



ThiagoSantos/Shutterstock.com

What challenges have you faced in math class and how have you overcome them?


Explore: Draw It

Do you see what I see?



Warm-Up



 eyes on teacher



I am a doer of math.

Why is it important to keep trying, even when something is difficult?

Discuss  What do you notice? What do you wonder?

Captain Bogwart's Treasure

Unit Story





- **Partner A:** Describe the image you drew to your partner. Be as clear and precise as possible so your partner can draw it.
- **Partner B:** Listen carefully to your partner's description of their image. Draw the image on your blank card.

When Partner B is done drawing, compare drawings. Switch roles and repeat.

Ways to be a mathematician

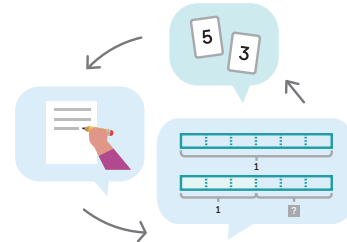
- 1** I can take my time to think about a challenging problem before trying to solve it.

○ ——— ○ ——— ○
Not yet Almost I got it!



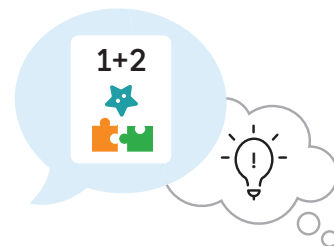
- 2** I can use numbers, words, and diagrams to make sense of math ideas and situations.

○ ——— ○ ——— ○
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!



Geometry Galore

Let's describe and draw different types of geometric figures.



Warm-Up



eyes on teacher



I am a doer of math.

How can you demonstrate perseverance today in math class?

Activity

1

Card Sort: Who Am I?

Hands-On

You will be given a set of cards with descriptions and drawings of geometric figures.

1 Sort

Sort the cards into 4 groups. Each group should represent 1 type of geometric figure — **point**, **line**, **ray**, or **line segment**. Be prepared to explain your thinking.

2 Discuss

- When your group finishes sorting the cards, compare your results with another group.
- If you sorted any cards differently, discuss your reasoning and consider if you want to make any changes to your sort.

1**Card Sort: Who Am I? (continued)**

- 3** Once you have your final sort, add a drawing for each geometric figure.

 Draw

point

line

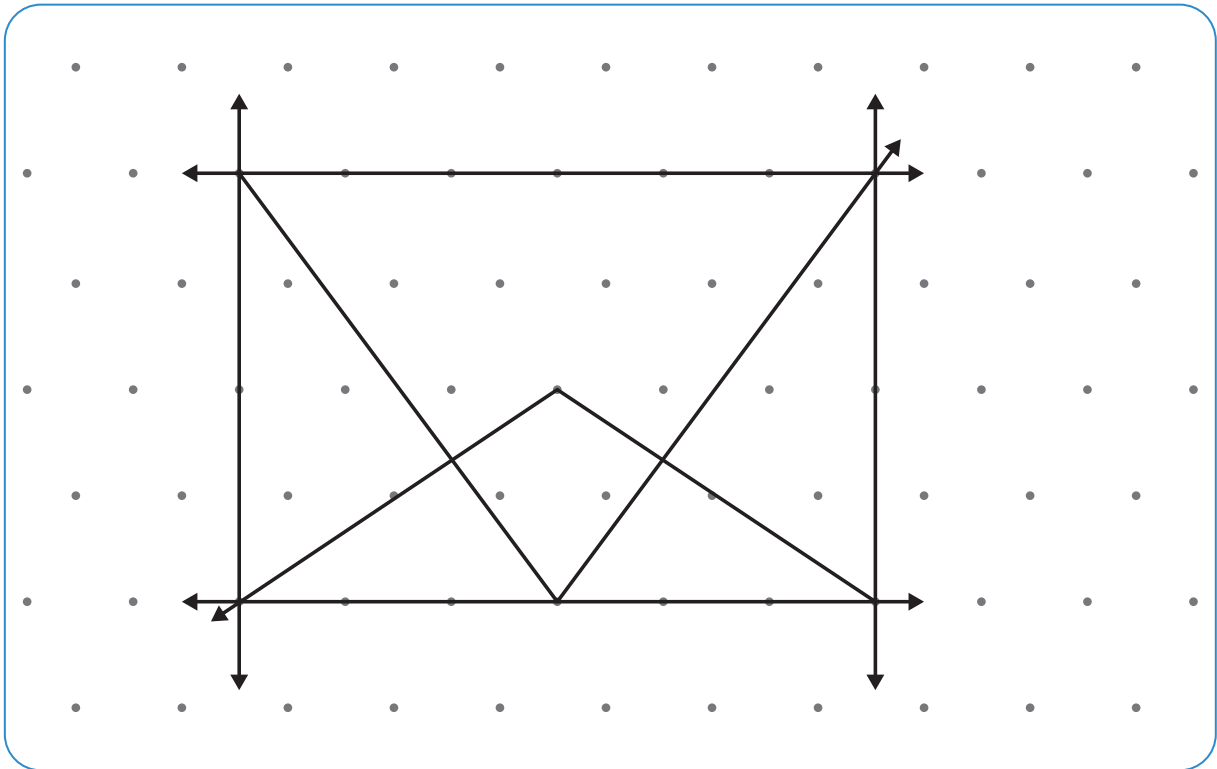
ray

line segment



Making Some Shapes

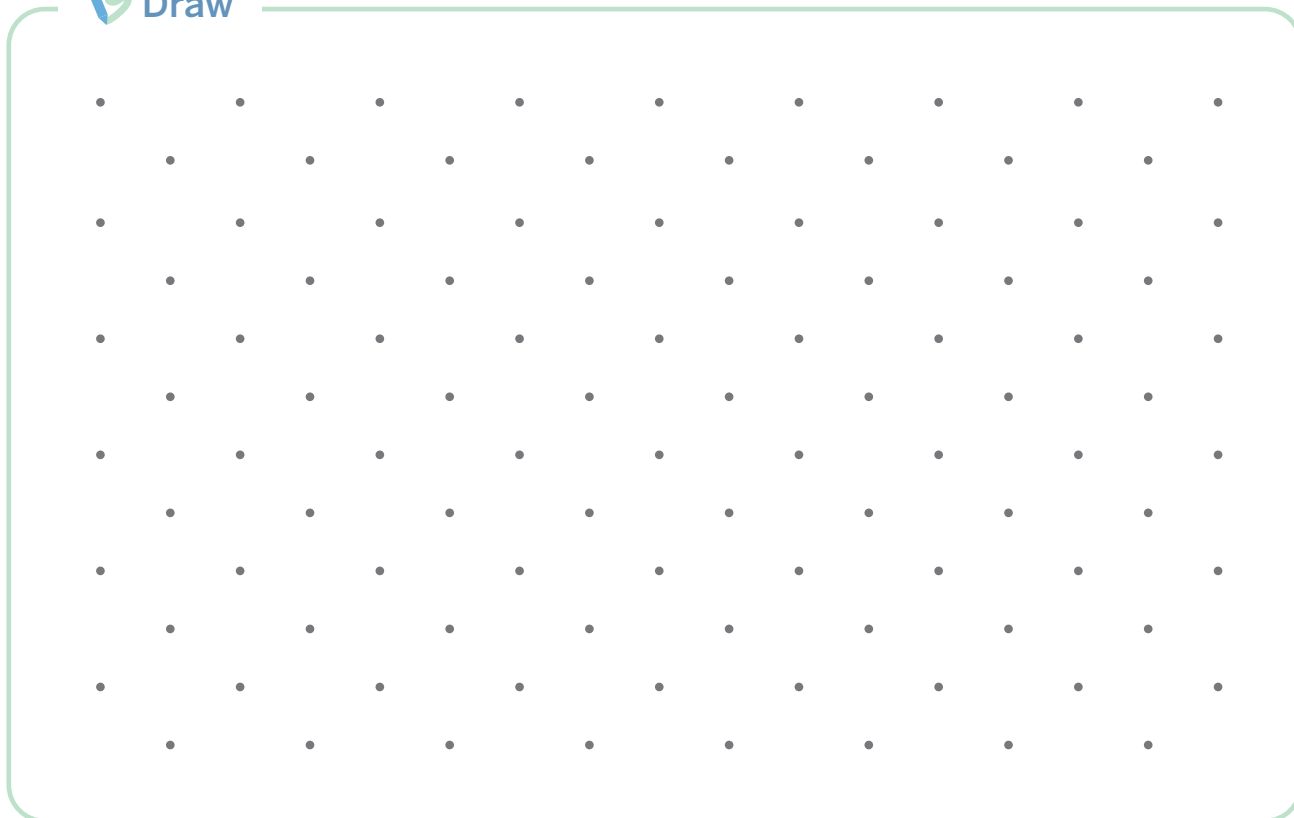
- 4 Highlight and label a *line*, a *line segment*, and a *ray* on the drawing.



Making Some Shapes (continued)

- 5 Use at least 1 line, 1 line segment, and 1 ray to draw a shape and a letter on the dot grid.

 Draw

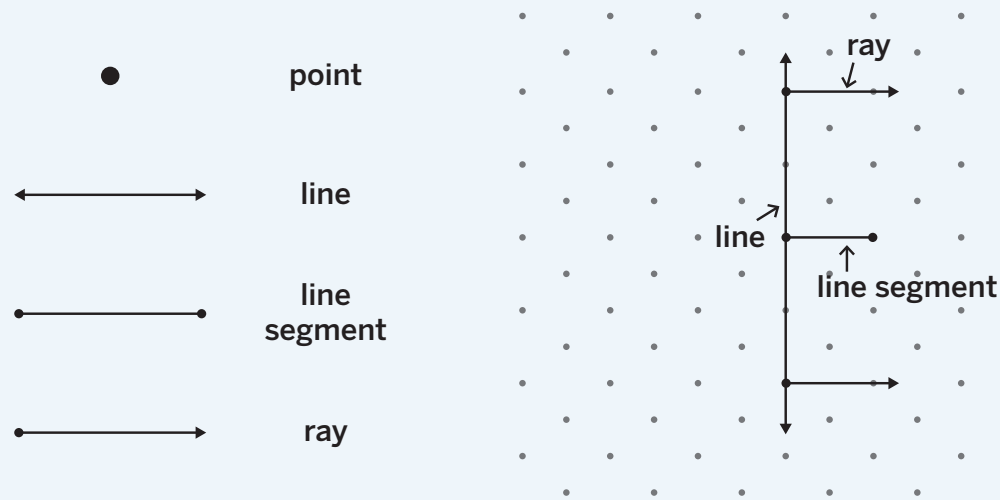


- 6 **Discuss** 

How can you tell where your partner used lines, line segments, and rays in their drawings?

Summary 7.02

Points, lines, line segments, and rays can be used to create geometric drawings. Arrows and sometimes dots are used in drawings to show the differences between lines, line segments, and rays.



ray A part of a line with 1 endpoint that extends infinitely in one direction.

Practice 7.02

- 1 Draw 4 points. Connect your points to draw as many line segments as you can.

 Draw

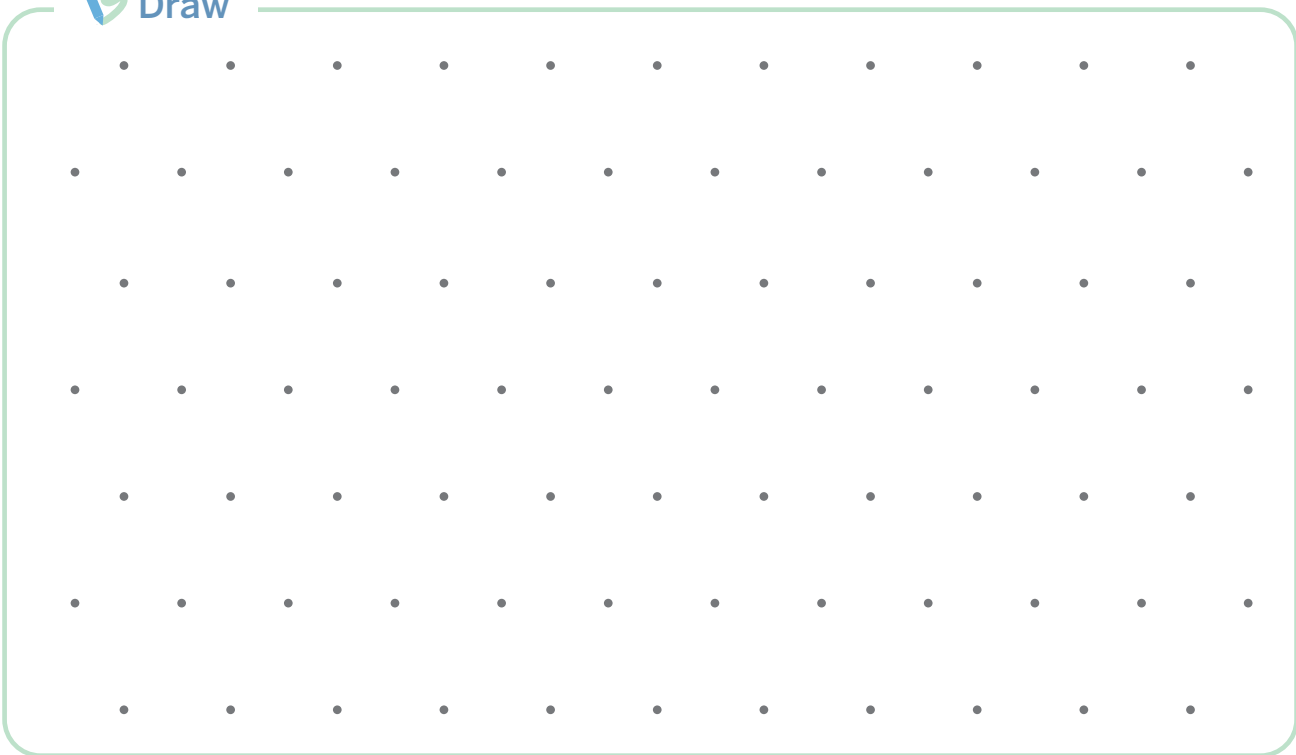


2 What shapes do you see in your drawing in Problem 1?

For Problems 3 and 4, use the dot grid.

3 Draw 3 line segments to create a triangle that goes through exactly 9 points on the grid.

4 Draw 2 lines and 2 rays to create a rectangle.



5 Which geometric object has a specific length that can be measured?

- (A) line
 (B) segment
 (C) ray
 (D) point

6 Which geometric objects go on forever in at least 1 direction?
Select *all* that apply.

- A. line B. segment
 C. ray D. point

- 7 Describe the difference between a line and a line segment.

Spiral Review

For Problems 8 and 9, determine the value of the expression.

 Show your thinking.

8 $6,525 - 3,192$

answer: _____

9 $9,145 \times 5$

answer: _____

- 10 A school auditorium has 7 rows of seats and 32 seats in each row. How many seats are in the auditorium?

- 11 Complete the comparison statement using $<$ or $>$.

3.98 _____ 3.89

Two or More Lines

Let's look at lines that cross and lines that do not cross.



We are a math community.
How do you show others that you are listening to them in math class?

Warm-Up



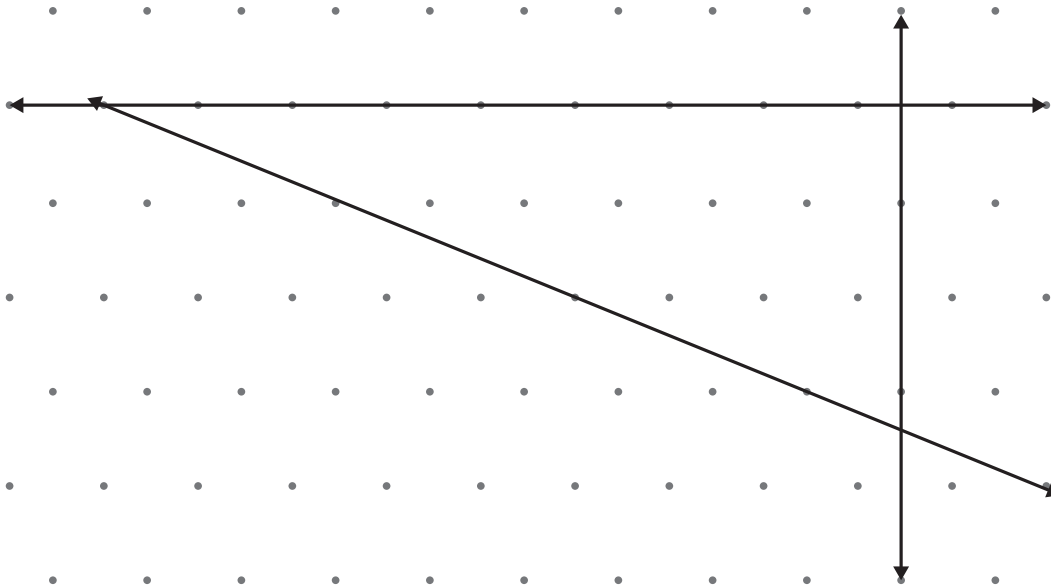
eyes on teacher

Activity

1

Four Lines

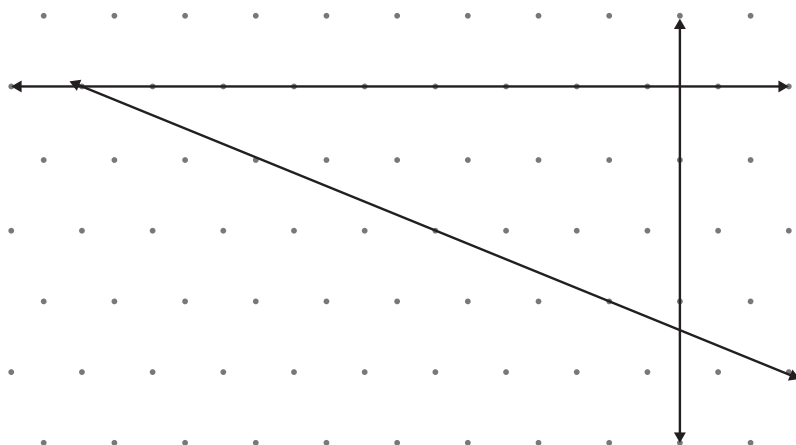
- Here is a drawing with 3 lines. Can you add a fourth line to create a quadrilateral? If it is possible, show it on the drawing. If it is not possible, be prepared to explain why.



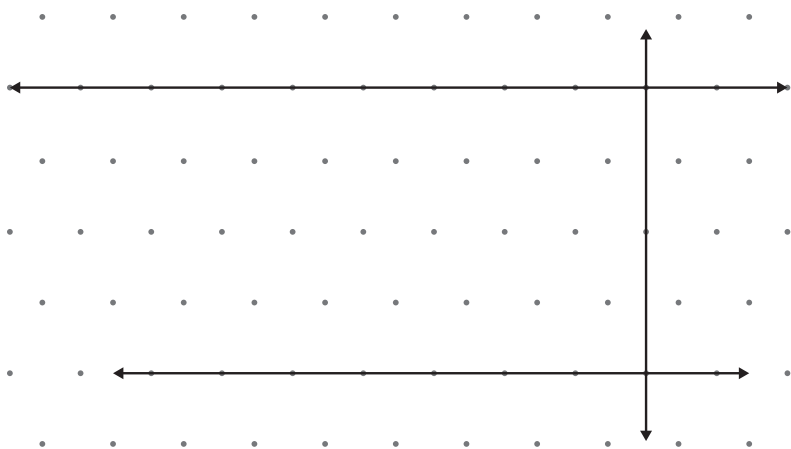
1

Four Lines (continued)

- 2 Here is a copy of the same drawing. Can you add a fourth line to create a rectangle? If it is possible, show it on the drawing. If it is not possible, be prepared to explain why.



- 3 Here is a different drawing of 3 lines. Can you add a fourth line to create a rectangle? If it is possible, show it on the drawing. If it is not possible, be prepared to explain why.



- 4 **Discuss** 

Compare your responses for Problem 2 with your partner.

To Cross or Not to Cross

Here is a dot grid. Each dot represents a point.



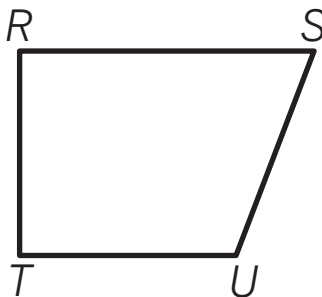
- 5 Draw a line through at least 2 points. Label the line JK .
- 6 Draw another line that goes through at least 2 points and intersects your first line. Label the line LM .
- 7 Draw a line that goes through at least 2 points and is perpendicular to line JK . Label the line NO .
- 8 Draw a line that you think would be parallel to line LM . Label the line PQ . If a line cannot be drawn, be prepared to explain why.

To Cross or Not to Cross (continued)

9

Discuss 

Here is a quadrilateral.

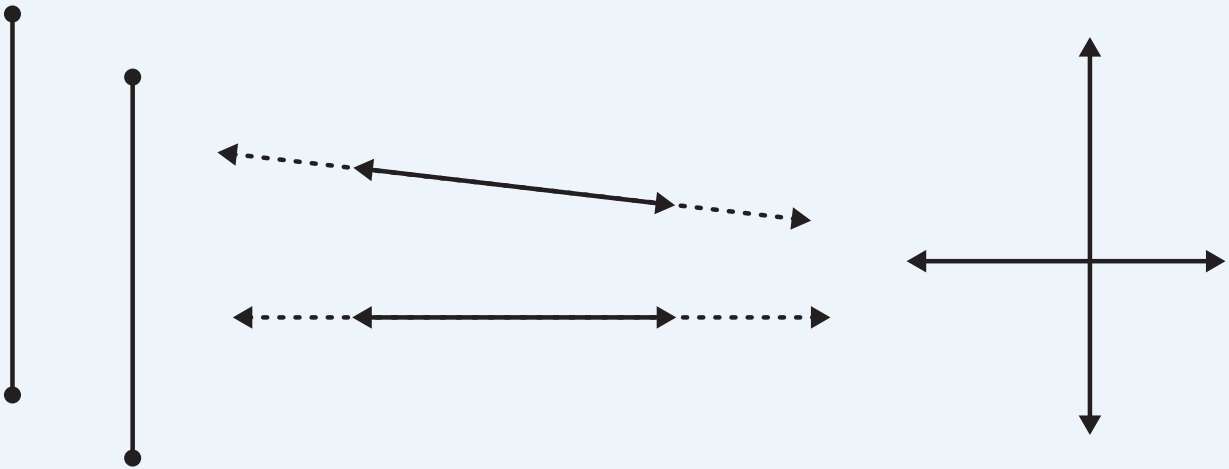


Look at the 2 pairs of opposite sides in the quadrilateral — RS and TU , and RT and SU .

- Do you think line segments RS and TU are parallel? Explain your thinking.
- Do you think line segments RT and SU are parallel? Explain your thinking.

Summary 7.03

Parallel lines will never cross. **Intersecting lines** cross. **Perpendicular lines** cross and form right angles. Sometimes, lines need to be extended to see if they will intersect.

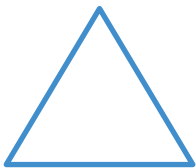


perpendicular line A line that crosses another line at a right angle.

Practice 7.03

1 Which shape has *at least* 1 pair of parallel sides?

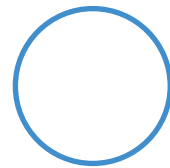
(A)



(B)



(C)



2 Which shape does *not* have any pairs of parallel sides?

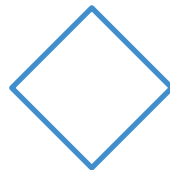
(A)



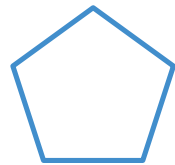
(B)



(C)



(D)



Practice 7.03

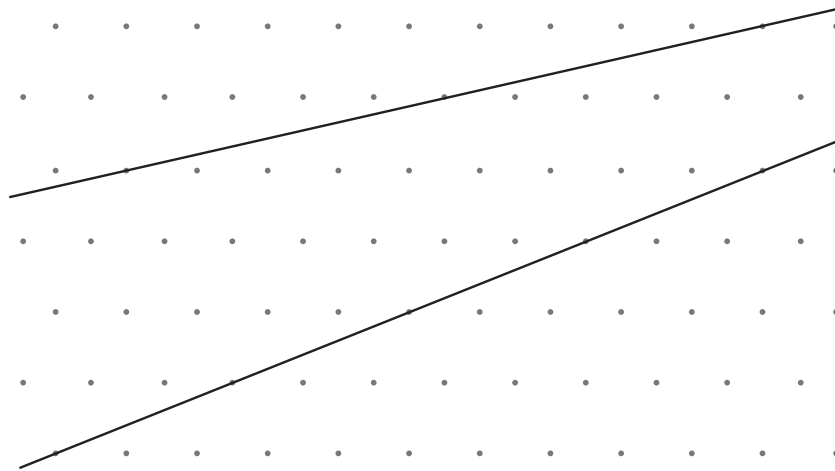
Name _____ Date _____

3 Draw 4 lines and 4 points so that lines AB and DC are parallel and lines AD and BC are parallel. Label the lines AB , BC , CD , and DA .

 Draw



For Problems 4 and 5, use the dot grid. Diego says these 2 lines are parallel because they do not look like they intersect.



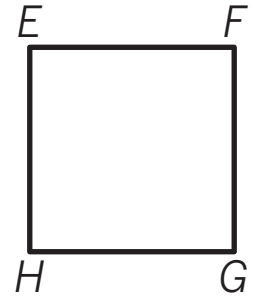
4 Explain why Diego is *not* correct.

5 Draw a line that is parallel to one of the lines on the dot grid.

Practice 7.03

Name _____ Date _____

- 6 Here is a square. Write 3 true statements about the square. Include the terms *opposite sides*, *intersect*, and *pairs*.



Spiral Review

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

 Show your thinking.

7 $24,783 + 8,606$

answer: _____

8 $4,374 \times 3$

answer: _____

- 9 A sheet of stickers has 12 rows with 18 stickers in each row. How many stickers are on the sheet?

- 10 913,408 rounded to the nearest multiple of 100 is _____.

- 11 610,538 rounded to the nearest multiple of 1,000 is _____.

Points and Lines Everywhere

Let's practice drawing different geometric figures.



We are a math community.

How can you work well with your partner today in math class?

Warm-Up



eyes on teacher

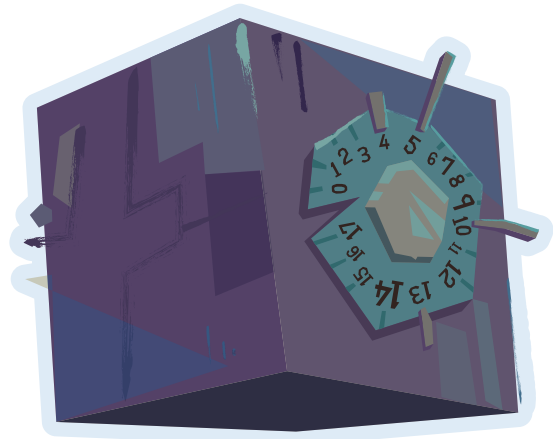
Activity

1

Geometry Town

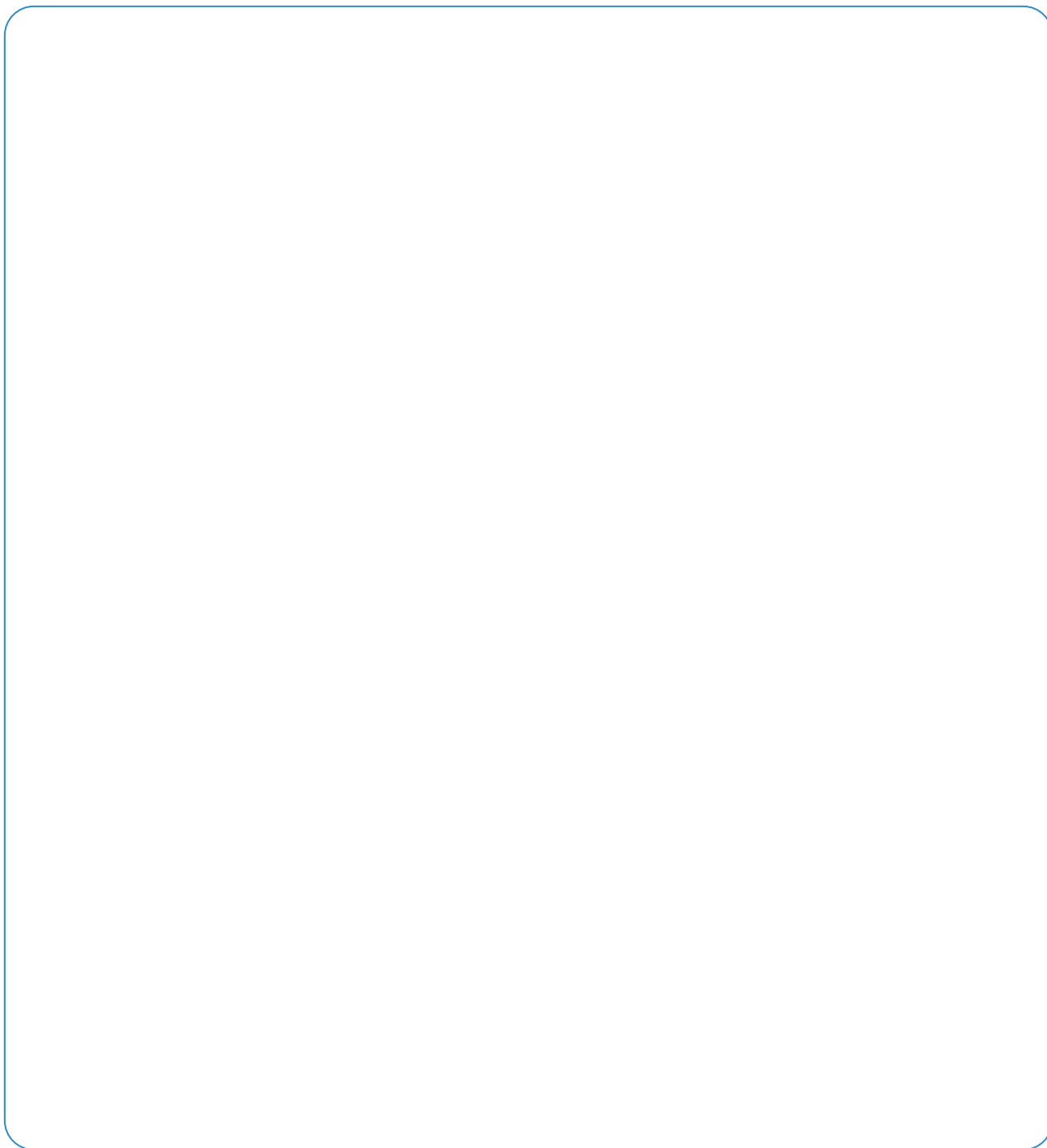
1 You will create a map of a town. Your town must have:

- 4 line segments of different lengths.
- 3 pairs of parallel lines or line segments.
- 2 pairs of intersecting lines or line segments.
- 2 pairs of perpendicular lines or line segments.
- 2 pairs of lines or line segments that are *not* parallel, and the intersections are *not* shown.
- 2 rays.
- 4 points labeled *A*, *B*, *C*, and *D*.



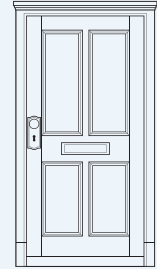
Geometry Town (continued)

Use the space to plan your town.



Summary 7.04

Geometric figures can be found in the real world.



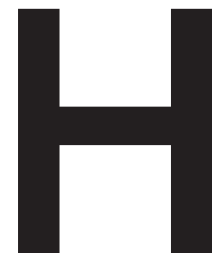
Lou Cannon/Shutterstock.com, Igorsky/Shutterstock.com, Anastasia Samorodova/Shutterstock.com, vectorisland/Shutterstock.com

Practice 7.04

- 1 Circle the 2 line segments in the letter Z that are parallel.




- 2 Describe how the 3 line segments in the letter H are related.




Practice 7.04

Name _____ Date _____

3  Which letters in the phrase FUN KITES have parallel line segments? Select *all* that apply.

- | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> A. F | <input type="checkbox"/> B. U | <input type="checkbox"/> C. N | <input type="checkbox"/> D. K |
| <input type="checkbox"/> E. I | <input type="checkbox"/> F. T | <input type="checkbox"/> G. E | <input type="checkbox"/> H. S |

4  Which letters in the phrase NIGHT OWL do *not* have any parallel line segments? Select *all* that apply.

- | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> A. N | <input type="checkbox"/> B. I | <input type="checkbox"/> C. G | <input type="checkbox"/> D. H |
| <input type="checkbox"/> E. T | <input type="checkbox"/> F. O | <input type="checkbox"/> G. W | <input type="checkbox"/> H. L |

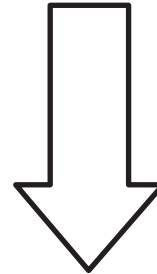
For Problems 5–8, circle the line segments that are parallel.

 Draw

5



6



7



8



- 9 Circle 2 line segments that are *not* parallel.



Spiral Review

For Problems 10 and 11, determine the value of the expression.

 Show your thinking.

10 $24,783 - 8,606$

answer: _____

11 $3,090 \div 3$

answer: _____

- 12 Priya donated 18 shirts to a clothing drive. Han donated 3 shirts to a clothing drive. How many times as many shirts did Priya donate than Han?

Priya donated _____ times as many shirts.

Angles and Angle Measurement

✦ Unit Story: Captain Bogwart's Treasure

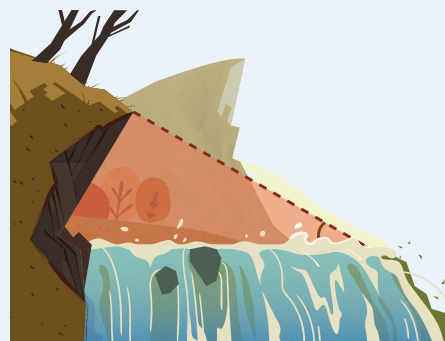


Benjaminpx/Shutterstock.com

What mathematical tools are your favorite to use?

Angle Adventures

Let's sort and name angles.



We are a math community.

How can you include the ideas of everyone in your group during class today?

Warm-Up



eyes on teacher

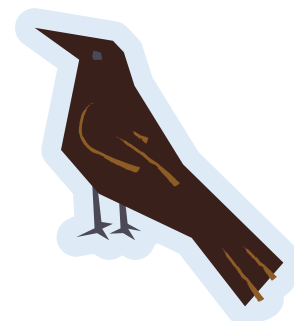
Activity

1

Card Sort: Geometric Figures

Hands-On 

You will be given a set of cards with geometric figures. Sort the figures into categories that make sense to you.



1**Card Sort: Geometric Figures (continued)**

- 1** Write words or phrases to describe each category and record the letters of the cards in each category. You do not need to use all the rows of the table.

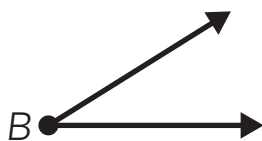
Category	Cards

2

Name That Angle

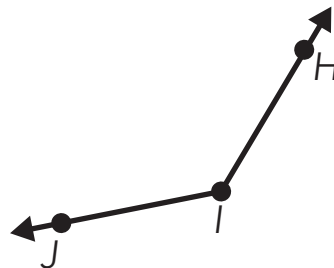
Name each angle. If you can, name the angles in different ways. Then explain to your partner about how you identified and named each angle.

2



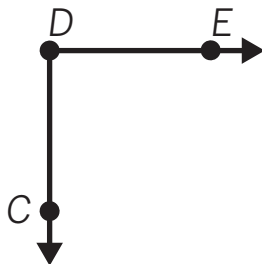
answer: _____

3



answer: _____

4



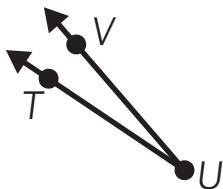
answer: _____

5



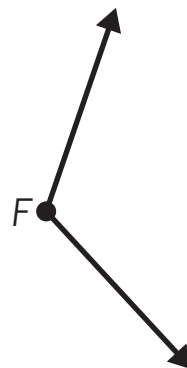
answer: _____

6



answer: _____

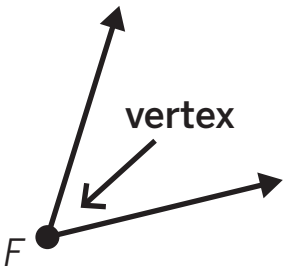
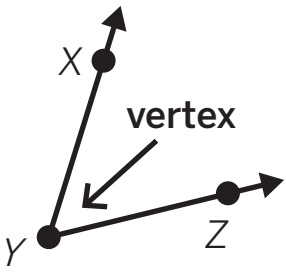
7



answer: _____

Summary 7.05

Angles are formed by 2 rays that share an endpoint called a **vertex**. You can name an angle by using the vertex or by using the 3 points, with the vertex listed in the middle.

Naming using the vertex	Naming using 3 points
 <p>angle F</p>	 <p>angle XYZ or angle ZYX</p>

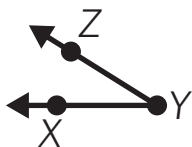
angle A geometric figure made up of 2 rays that share the same endpoint.

vertex The point where the 2 rays of an angle meet.

Practice 7.05

1 Which angle represents angle K ?

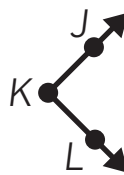
(A)



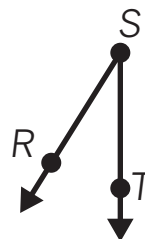
(B)



(C)



(D)

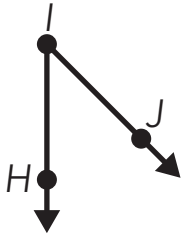


Practice 7.05

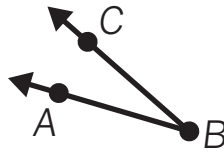
Name _____ Date _____

2 Which angle represents angle ABC ?

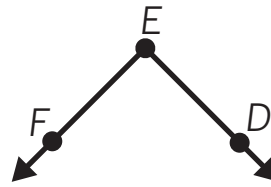
(A)



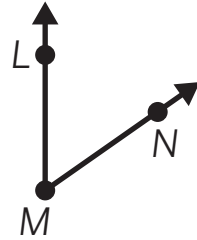
(B)



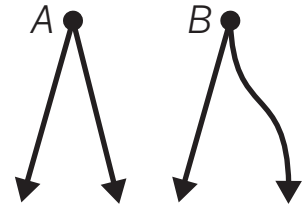
(C)



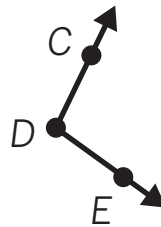
(D)



3 Jada says Figure A shows an angle, and Figure B does not. Do you agree? Explain your thinking.

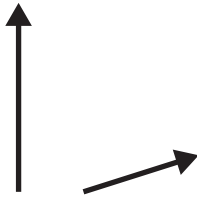


4 Name the angle.

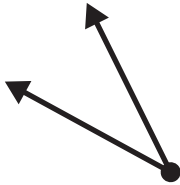


5 Which figures are angles? Select *all* that apply.

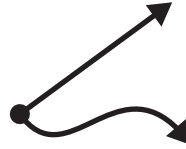
A.



B.



C.



D.



Spiral Review

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

i Show your thinking.

6 $36,829 + 46,075$

7 $7,438 \times 7$

answer: _____

answer: _____

8 An electronics store has 126 second-hand video games for sale. The video games are equally divided between 7 shelves. How many video games are on each shelf?

9 Complete the comparison statement using $<$ or $>$.

0.76 _____ 0.79

Angles in Motion

Let's think about the relationship between angles and turns.



I am a doer of math.

What helps you feel comfortable sharing your math ideas?

Warm-Up



eyes on teacher

Activity

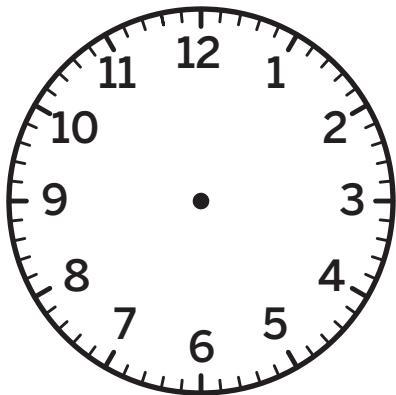
1

Angles on a Clock

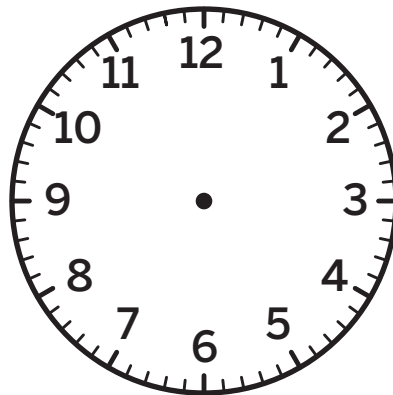
For each angle described, use your arms as the rays to represent the angle. Then draw a picture of the angle you made.

Draw

- 1 Start with both rays pointing at the 6. Turn one ray until it is pointing at the 3.



- 2 Start with both rays pointing at the 6. Turn one ray until it is pointing at the 9.

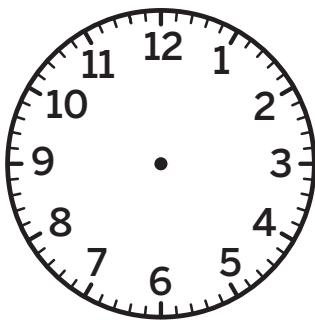


1**Angles on a Clock (continued)****3** Discuss 

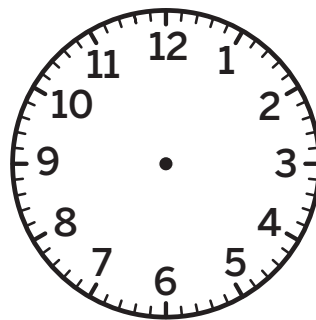
How are the angles for Problems 1 and 2 the same?
How are they different?

 Draw

- 4** Start with both rays pointing at the 12. Turn one ray to the right until it is pointing at the 5.



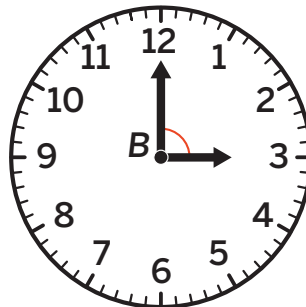
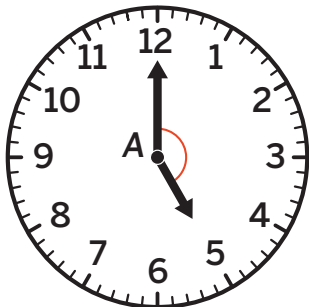
- 5** Start with both rays pointing at the 12. Turn one ray to the left until it is pointing at the 5.

**6** Discuss 

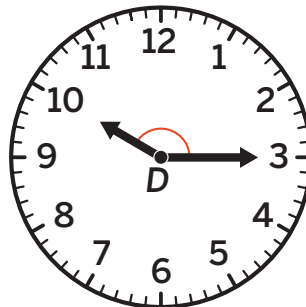
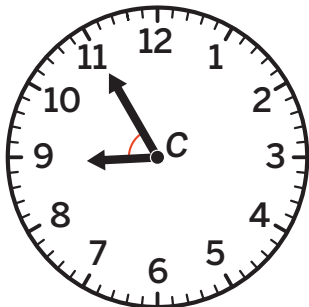
How are the angles for Problems 4 and 5 the same?
How are they different?

Comparing Angles on the Clock

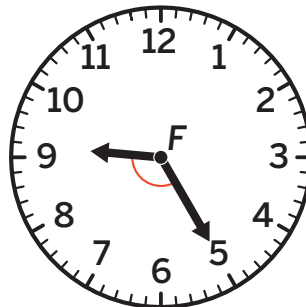
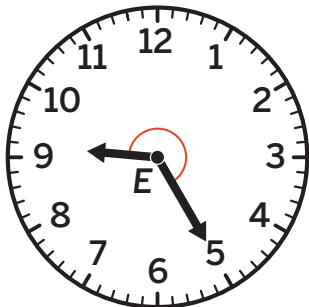
7 Which angle is larger?



8 Which angle is larger?

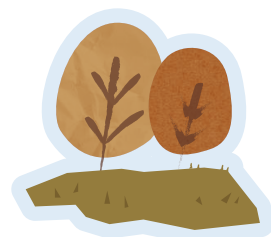


9 Which angle is larger?



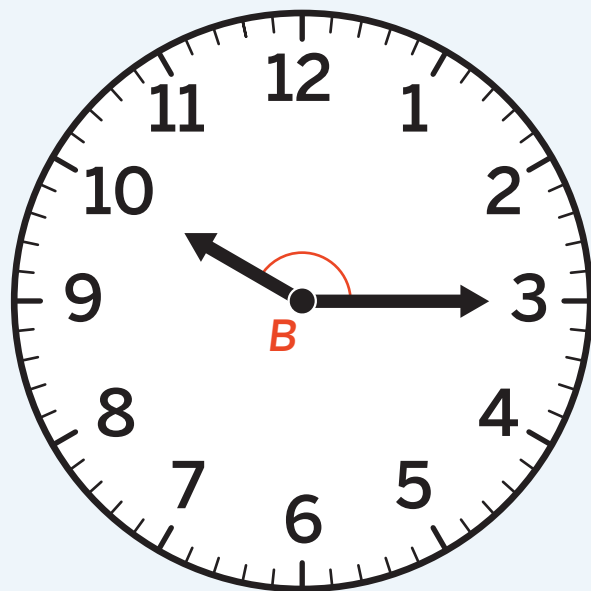
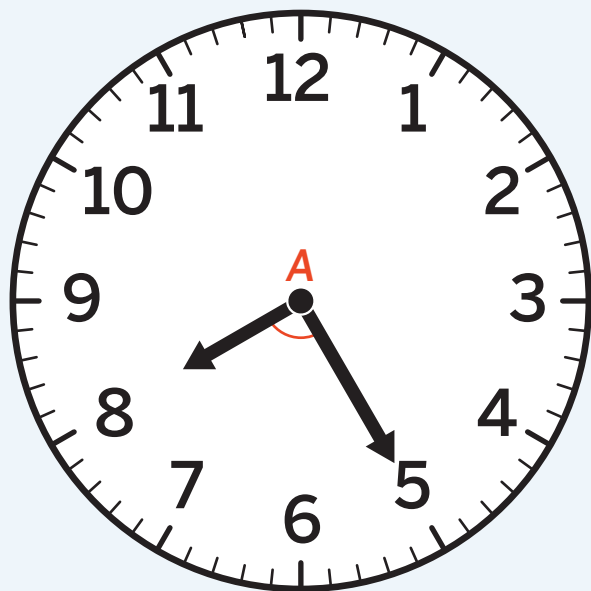
Comparing Angles on the Clock (continued)**10 Discuss** 

What strategies did you use for Problems 7–9 to determine which angle was larger?



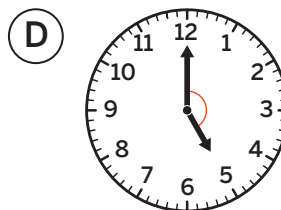
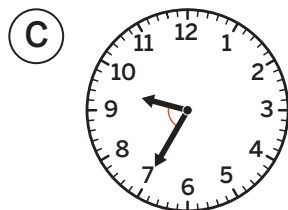
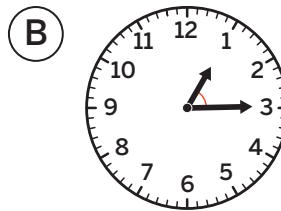
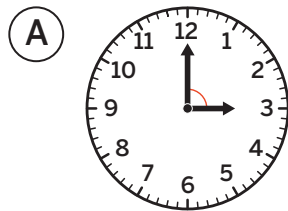
Summary 7.06

You can use a clock to visualize the turning of rays around an endpoint to create and describe an angle.



Practice 7.06

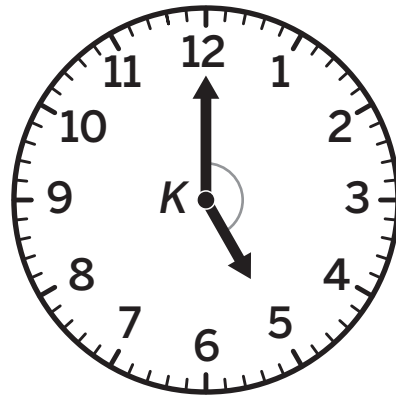
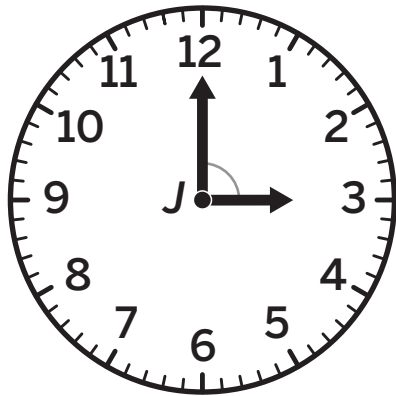
1 Which clock shows the largest angle?



Practice 7.06

Name _____ Date _____

2 Circle the clock that shows the *largest* angle.



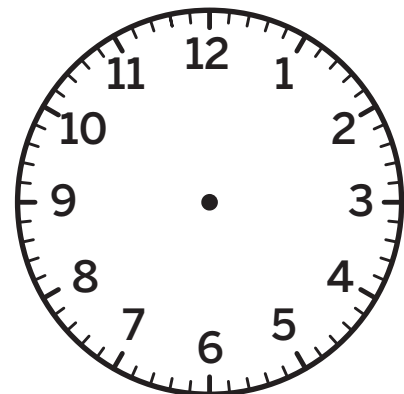
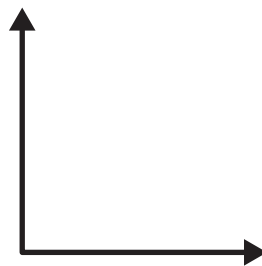
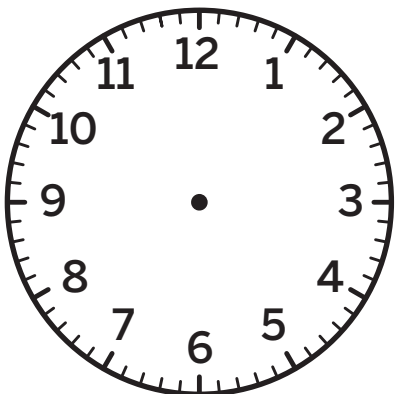
3 For Problem 2, how do you know which angle is larger? Explain your thinking.

4 Draw an angle on each clock face. One should be *smaller* than the given angle, and one should be *larger* than the given angle.

Smaller angle

Given angle

Larger angle



Spiral Review

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

 Show your thinking.

5 $13,008 - 11,837$

6 $1,824 \div 4$

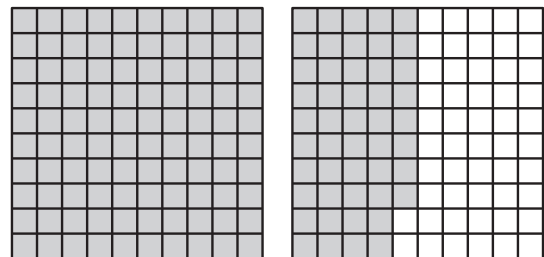
answer: _____

answer: _____

- 7 Write a fraction and a decimal to represent the diagram.

fraction: _____

decimal: _____



- 8 Complete the comparison statement using $<$ or $>$.

1.24 _____ 1.4

The Spin on Angles

Let's explore a standard unit of measure for describing the size of angles.



We are a math community.
How can you use the perspective of others to help you learn today?

Warm-Up

1-2

eyes on teacher

Activity

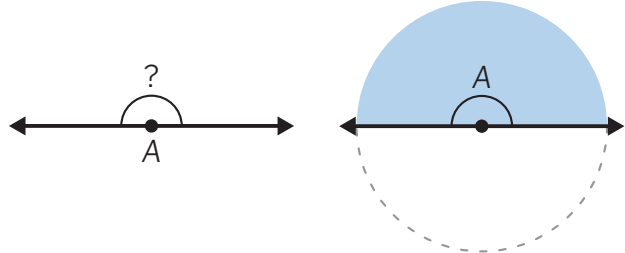
1

Angles in Parts of a Circle

3

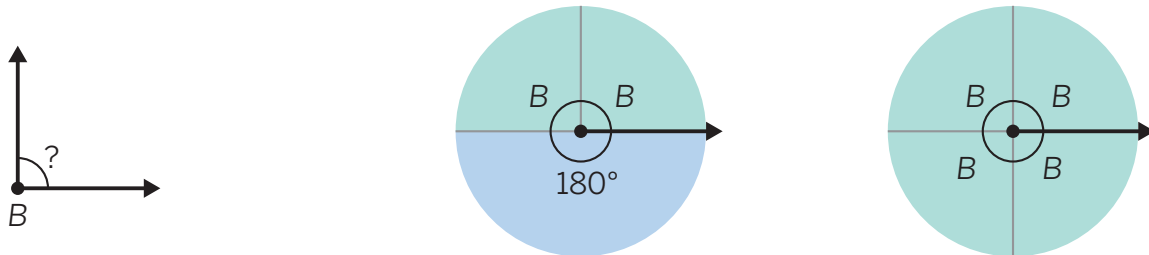
Discuss

1 full turn = 360° . Describe the size of angle A to your partner.



4

What is the measure of angle B in degrees?



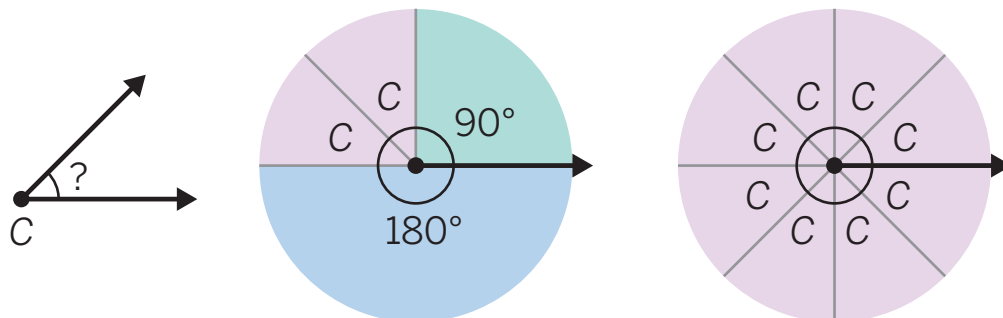
Show or explain your thinking.

answer: _____

1

Angles in Parts of a Circle (continued)

5 What is the measure of angle C in degrees?

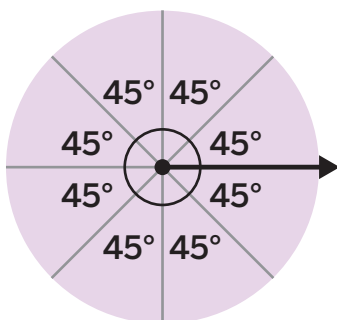


i Show or explain your thinking.

answer: _____

6 Discuss

Priya says that 45 degrees is $\frac{1}{8}$ or $\frac{45}{360}$ of a full turn. Do you agree with Priya? Why or why not?



7 Let's watch a video.



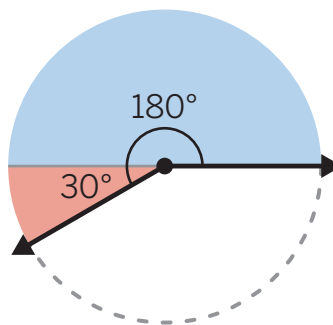
2

Additive Angles

8

Discuss 

Determine the measure of the unknown angle shown in the diagram.
Explain your strategy to your partner.

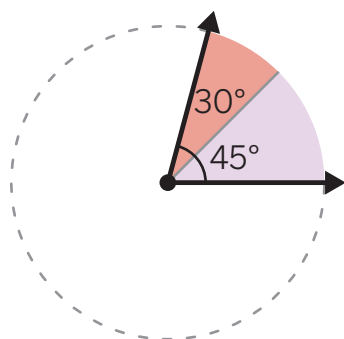


9

Determine the measurement of each unknown angle.



Show your thinking.

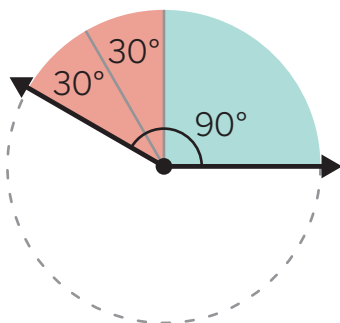


answer: _____

Additive Angles (continued)

9

 Show your thinking.



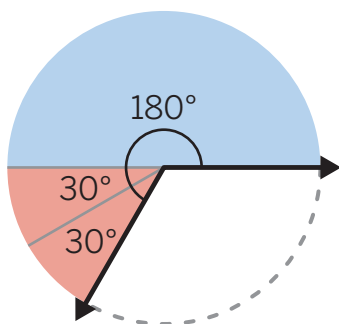
answer: _____

10

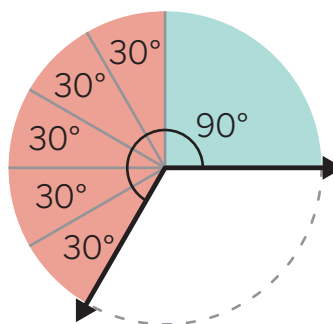
Discuss 

Priya and Han used different strategies to determine the measure of an unknown angle. What is similar about their strategies? What is different?

Priya's angle

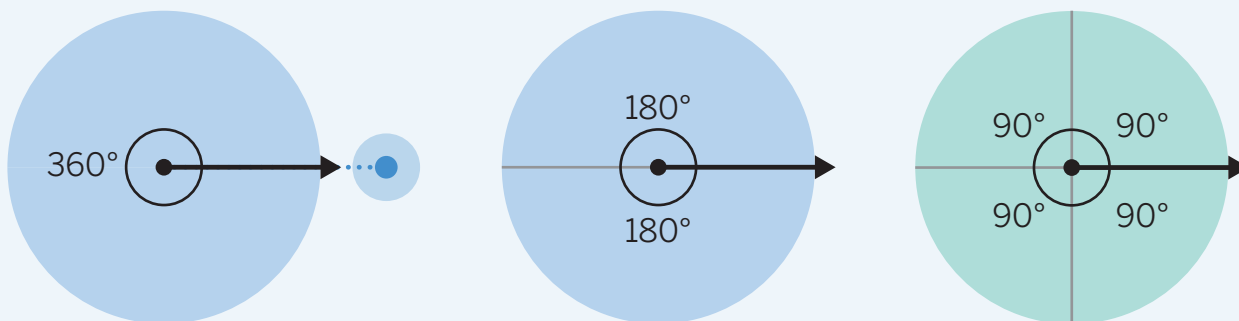


Han's angle



Summary 7.07

Angles are measured in **degrees**. A circle measures 360° . An angle that turns through $\frac{1}{360}$ of a full circle is called a one-degree angle. An angle that turns through 180-one-degree angles (a half circle) measures 180° . An angle that turns through 90-one-degree angles (a quarter circle) measures 90° .



degree A standard unit for measuring the size of an angle.

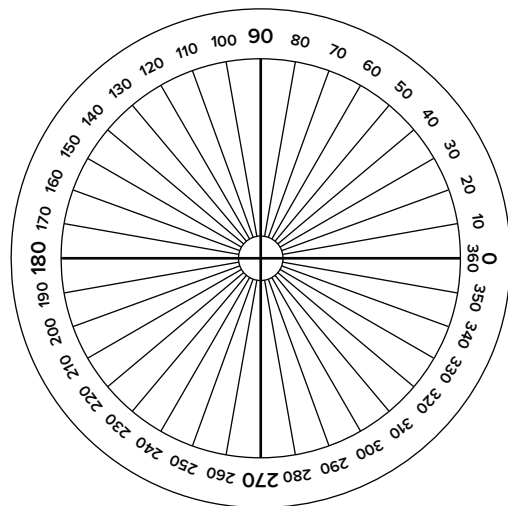
Practice 7.07

Use the image for Problems 1–3 if it is helpful.

- 1 What fraction of a full turn is 40° ?

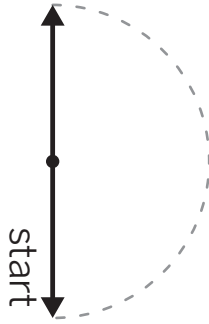
- 2 What fraction of a full turn is 90° ?

- 3 How many 120° angles does it take to make a full turn?



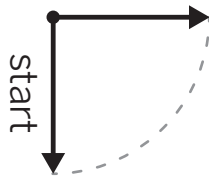
For Problems 4–6, determine the measurement of the angle.

4



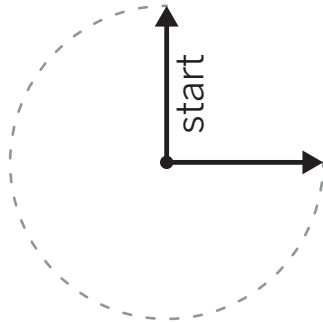
answer: _____

5



answer: _____

6



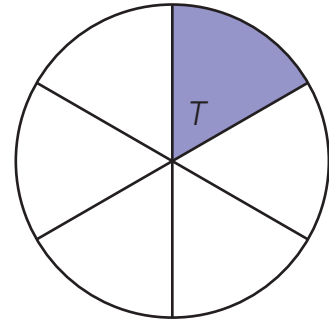
answer: _____

Practice 7.07

Name _____ Date _____

Use the image for Problems 7 and 8.

- 7 What fraction of a circle is angle T ?



- 8 What is the measure of angle T in degrees?

Spiral Review

For Problems 9 and 10, determine the value of the expression.

 Show your thinking.

9 $2,899 + 8,728$

answer: _____

10 46×24

answer: _____

- 11 333,482 rounded to the nearest multiple of 1,000 is _____.

Angle Accuracy

Let's use a tool to measure angles more precisely.



Warm-Up



eyes on teacher



I am a doer of math.

How can you use a growth mindset today?

Activity

1

Using a Protractor

Hands-On 

You will be given a protractor, a tool for measuring the number of degrees in an angle.

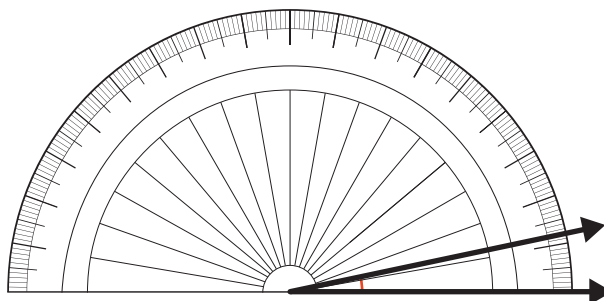
1 Discuss

- How is 1° shown on this protractor?
- How much of a full turn of a circle does this protractor represent?
- What is the largest angle you could measure with this protractor?

Using a Protractor (continued)

The image shows a protractor that has been placed over an angle. Notice:

- The protractor does not show any numbers.
- The center of the protractor is lined up with the vertex.
- The straight edge of the protractor is lined up with 1 ray.



2 What is the measure of the angle in degrees?

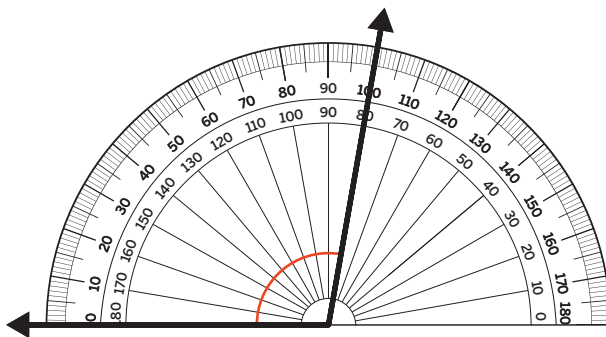
3 **Discuss** 

Explain how you determined the measure of the angle.

2

Measuring Angles

Clare and Han both measured the angle with a protractor. Clare said the angle has a measure of 80° . Han said it has a measure of 100° .

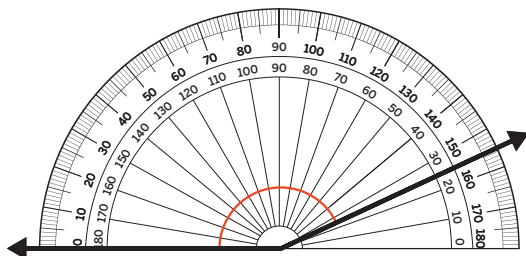
4 Discuss 

Who do you agree with — Clare or Han? How might they have ended up with different measurements using the same protractor?

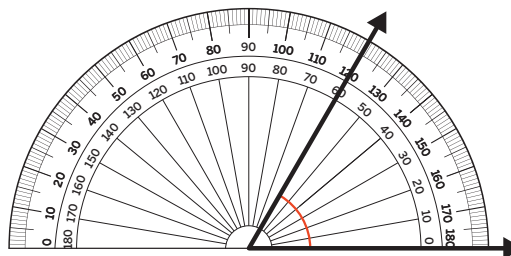
Measuring Angles (continued)

Determine the size of each angle in degrees.

5

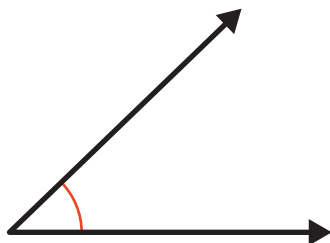


6

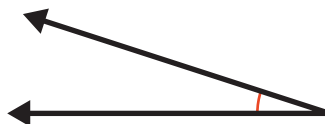


Using a protractor, determine the size of each angle in degrees.

7

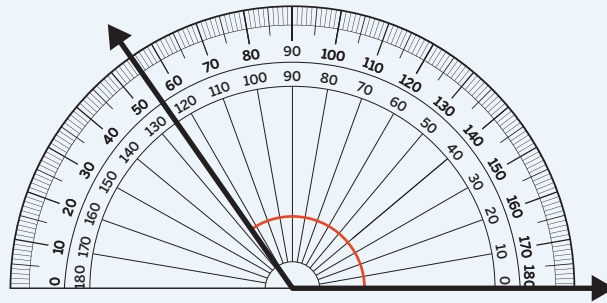


8



Summary 7.08

A **protractor** is used to precisely measure the size of an angle. You line up one ray with a 0 and determine the number the other ray passes through, making sure you use the set of numbers counting up from the 0 at the first ray.

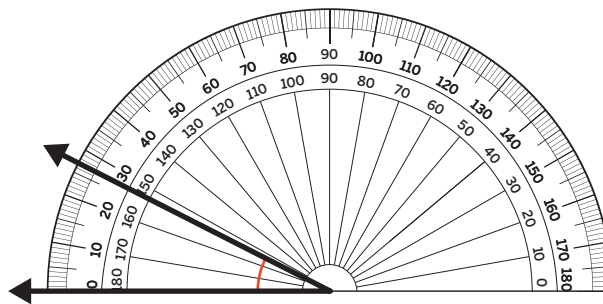


The angle is 125° .

protractor A tool for measuring the number of degrees in an angle.

Practice 7.08

- 1  What could be the measure of the angle?



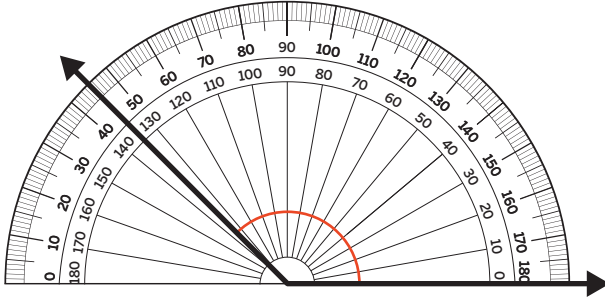
- (A) 30° (B) 27° (C) 153° (D) 167°

Practice 7.08

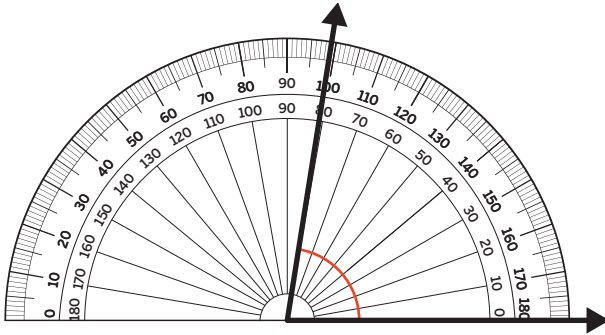
Name _____ Date _____

For Problems 2–5, use the images or a protractor to determine each angle measurement.

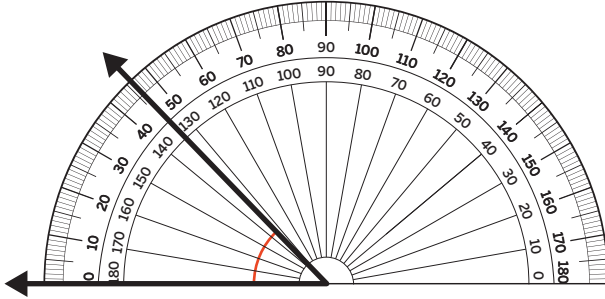
2



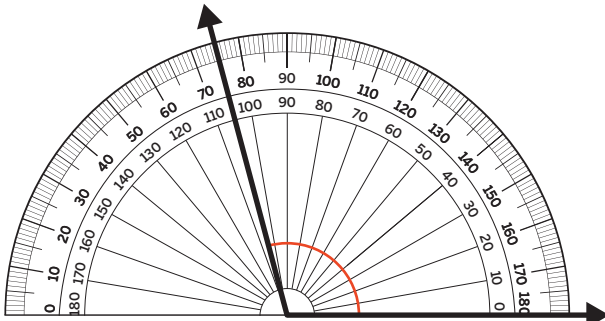
3



4



5



Spiral Review

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

 Show your thinking.

6 $8,047 - 2,958$

answer: _____

7 $6,291 \div 3$

answer: _____

- 8** Shawn purchased a bouquet of flowers. The bouquet has 6 roses and 6 times as many carnations. How many carnations are in the bouquet?

- 9** Clare purchased a bouquet of flowers. The bouquet has 8 roses and 40 carnations. How many times more carnations does the bouquet have than roses?

Types of Angles

Let's measure and name angles based on their size.



We are a math community.
What should you do if you and your partner get different answers?

Warm-Up



eyes on teacher

Activity

1

Card Sort: Classifying Angles

Hands-On

You will be given a set of cards with angles.

- 1 Measure the angles on Cards A, B, C, and D using a protractor. Record the measurements in degrees.

Card	Measurement in degrees
A	
B	
C	
D	

1**Card Sort: Classifying Angles (continued)**

- 2** Sort Cards A–J into the categories shown in the table. List the letters of the cards that belong in each category.

Acute angles	Right angles	Obtuse angles	Straight angles

3 Discuss 

- Join another pair. Take turns sharing which category you placed the angles in and explaining how you decided which categories each angle belonged in.
- Make any adjustments to your card sort that you feel are necessary.

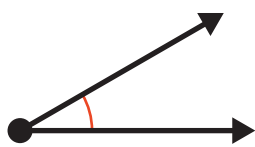
Measuring Angles

Measure each angle using a protractor. Then label each angle with its measurement and determine whether it is an acute, right, obtuse, or straight angle.



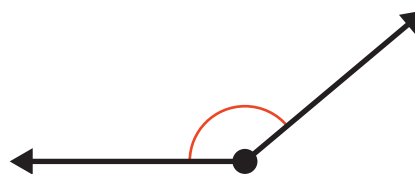
Show your thinking.

4



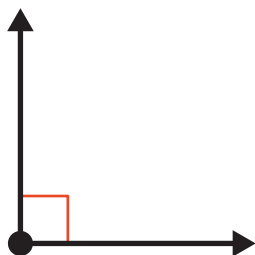
answer: _____

5



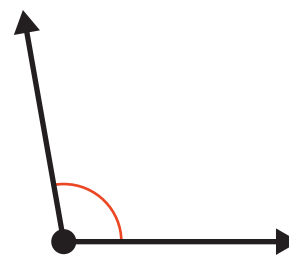
answer: _____

6



answer: _____

7



answer: _____

Measuring Angles (continued)

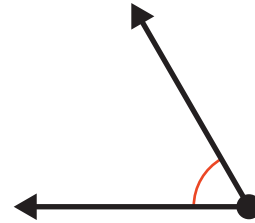
 Show your thinking.

8



answer: _____

9



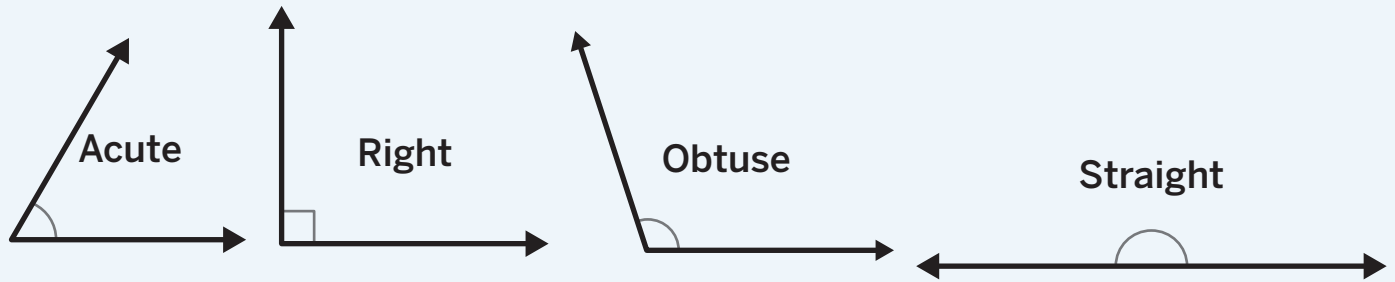
answer: _____

10 Discuss 

Compare your measurements with a partner. How did you know whether the angle was acute, right, obtuse, or straight?

Summary 7.09

Angles are classified by their size into 4 categories — acute angles, right angles, obtuse angles, and straight angles.



acute angle An angle whose measure is less than 90 degrees.


obtuse angle An angle whose measure is greater than 90 degrees but less than 180 degrees.

Practice 7.09

- 1 The angle formed by the wind turbine measures 120° . Name the angle as *acute*, *right*, *obtuse*, or *straight*.



fokke baarssen/Shutterstock.com

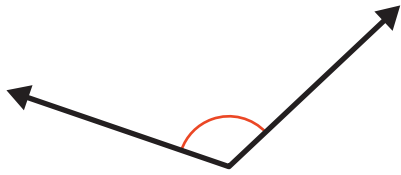
- 2  An angle measures 38° . Which name describes the angle based on its size?
- (A) acute (B) obtuse (C) right (D) straight

Practice 7.09

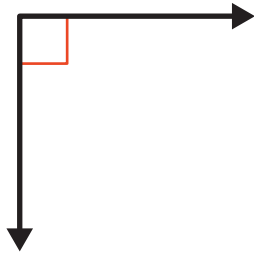
Name _____ Date _____

For Problems 3–7, name the angle as *acute*, *right*, *obtuse*, or *straight*.

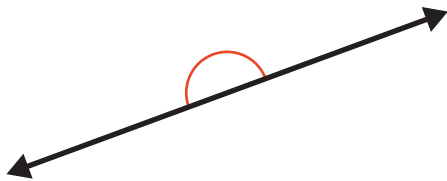
3



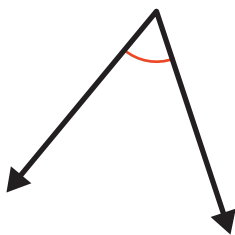
4



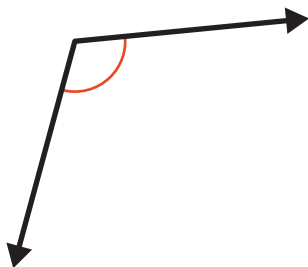
5



6



7



Spiral Review

For Problems 8 and 9, determine the value of the expression.

 Show your thinking.

8 $27,365 + 23,905$

answer: _____

9 $3,235 \times 6$

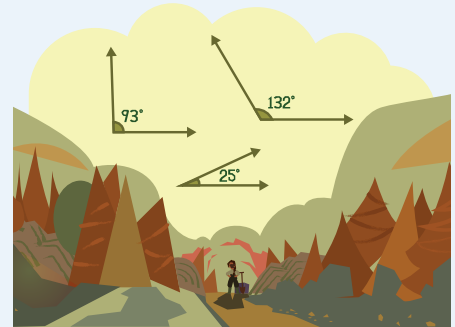
answer: _____

- 10 The heights of volcanoes in the United States are shown in the table. Round each height to the nearest 100 feet.

Volcano	Height (feet)	Rounded value
Buzzard Creek, AK	2,723	
Amboy Crater, CA	984	
Valles Caldera, NM	11,253	
Strawberry Crater, AZ	6,526	
Mauna Loa, HI	13,679	
Steamboat Springs, NV	4,642	
Mount Hood, OR	11,237	

Art of Angles

Let's use protractors to draw angles.



Warm-Up



eyes on teacher



I am a doer of math.

How did you organize your work when drawing angles?

Activity

1

Drawing Angles

Use a protractor and a ruler or straightedge to draw each angle.

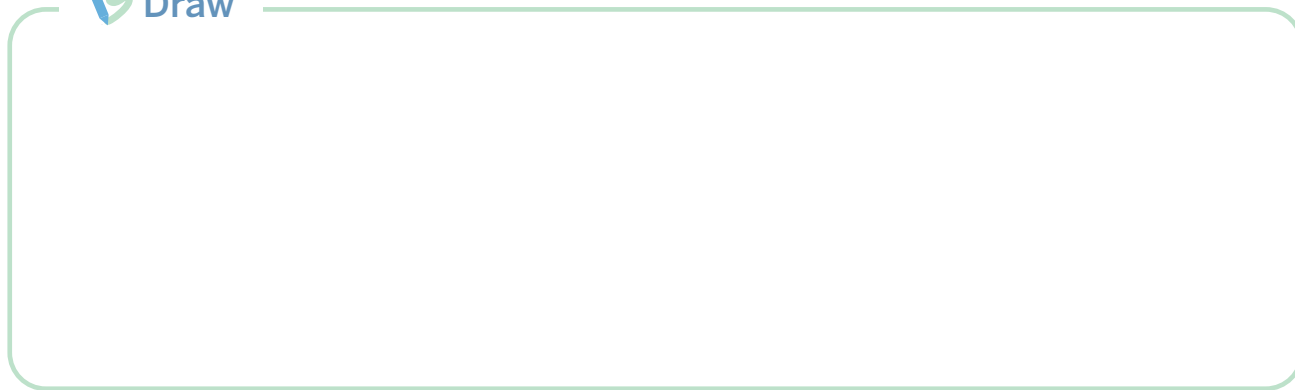
- 1 Here is a ray that starts at point M . Draw another ray starting at point M to create an angle.

Draw



1**Drawing Angles (continued)**

- 2 Draw an obtuse angle. Label the measurement.

 Draw

- 3 Draw an acute angle. Label the measurement.

 Draw

- 4 **Discuss** 

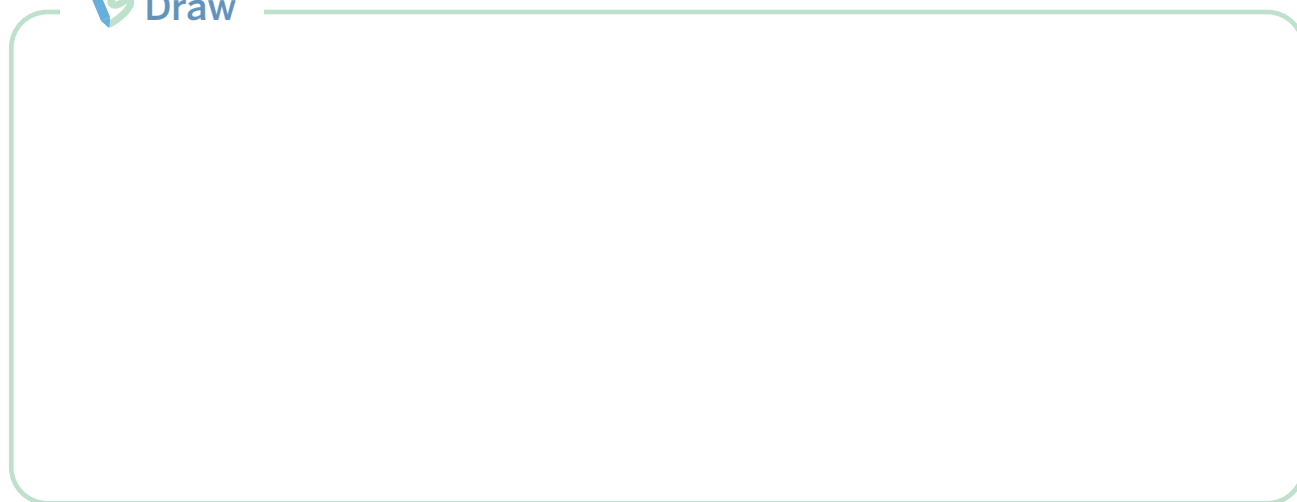
Compare your angles for Problems 2 and 3 with your partner's angles. How are they similar? How are they different?

Small Angles, Large Angles

Use a protractor and a ruler or straightedge to draw each angle.


- 5 Draw an angle that measures 25° . Label the measurement.

 Draw



- 6 Draw an angle that measures 92° . Label the measurement.

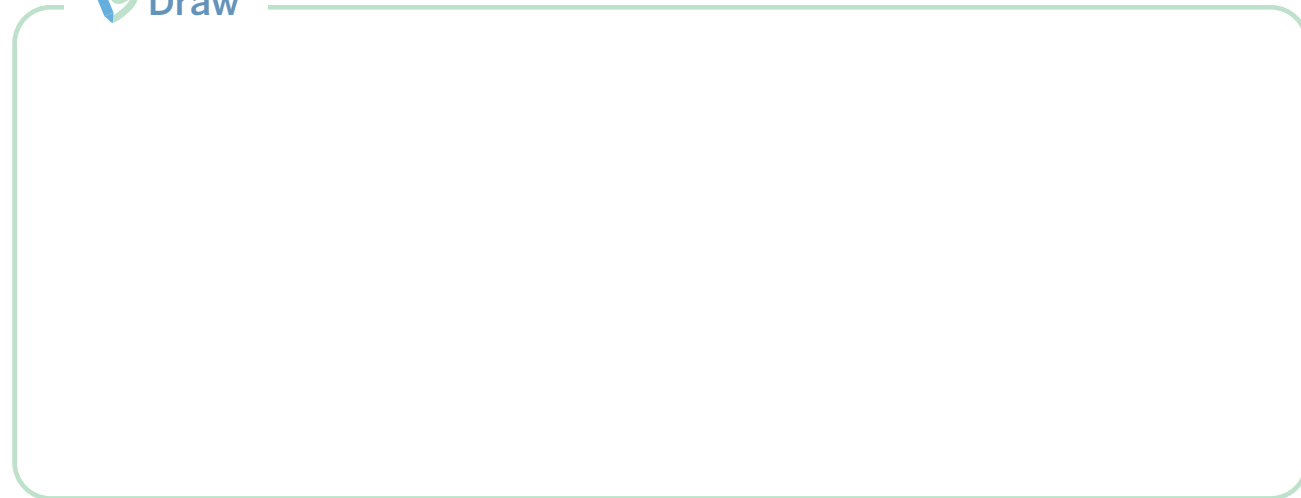
 Draw



Small Angles, Large Angles (continued)

- 7 Draw an angle that measures 114° . Label the measurement.

 Draw



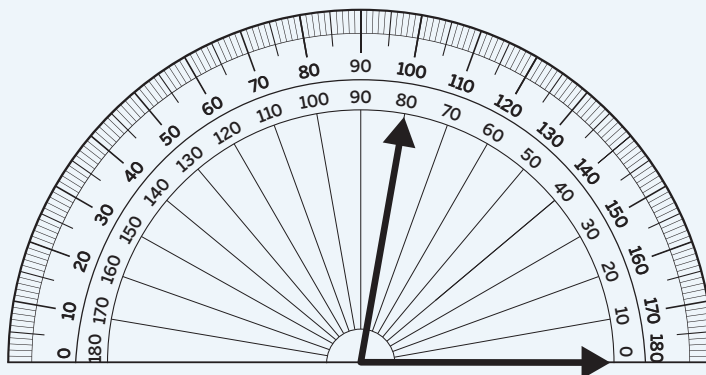
- 8 **Discuss** 

- Trade books with a partner and use your protractor to check the measurements of your partner's angles.
- Make any adjustments to your work that you feel are necessary.

Summary 7.10

Protractors can be used to draw specific types of angles or draw angles with specific measurements.

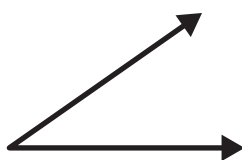
Draw an acute angle.



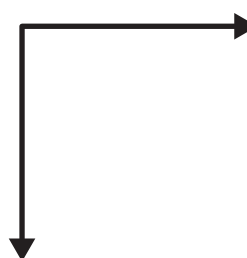
Practice 7.10

1 Without measuring, which angle looks like it is about 45° ?

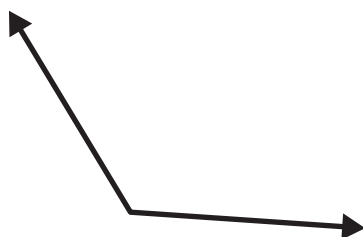
(A)



(B)



(C)



(D)



For Problems 2–5, draw the angle. Label the measurements.

 **Draw**

2 Draw a ray. Use the ray to draw as many different 35° angles as you can.

3 Draw an angle that is between 25° and 45° .

4 Draw an angle that is 130° .

5 Draw an angle that is greater than 180° but less than 270° .

Spiral Review

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

 Show your thinking.

6 $6,099 + 5,927$

answer: _____

7 52×16

answer: _____

For Problems 8–11, complete the comparison statement using $<$, $>$, or $=$.

8 1.5 _____ 1.05

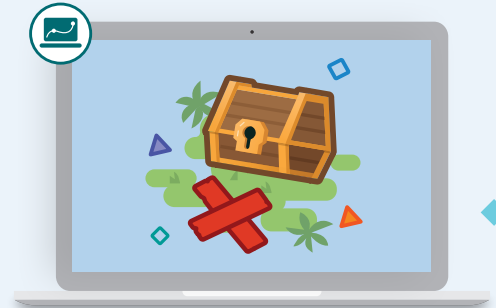
9 $\frac{7}{10}$ _____ $\frac{80}{100}$

10 $\frac{2}{100}$ _____ 0.02

11 3.2 _____ 3.06

Treasure Tracker

Let's determine the measurements of angles without a protractor.



Warm-Up

1 eyes on teacher

We are a math community.
How can you use the ideas of others when working together?

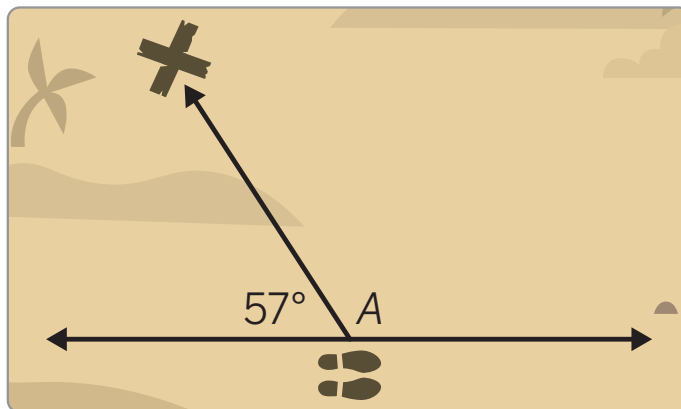
Activity

1 Angle Mystery

Help Kayla find the treasure by determining the measurement of each unknown angle without using a protractor.

Show your thinking.

2 angle A



answer: _____

1

Angle Mystery (continued)

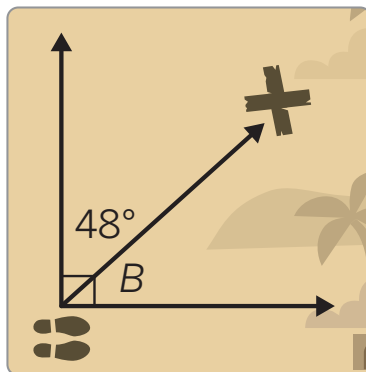
Help Kayla find the treasure by determining the measurement of each unknown angle without using a protractor.



Show your thinking.

3

angle B



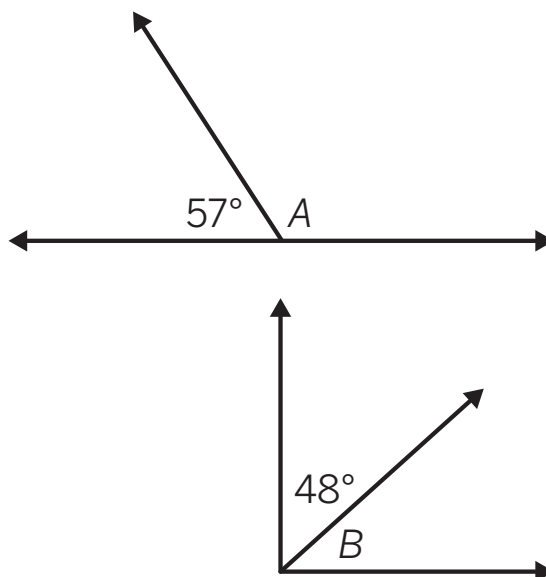
answer: _____

4

Discuss

How are the 2 smaller angles related to the larger angle in each diagram?

What equations could you write to represent how you determined the measure of each angle?

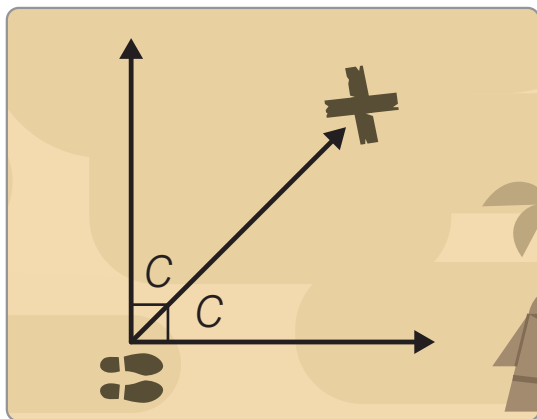


Unknown Angles

Help Kayla find the treasure by determining the measurement of each unknown angle. Each angle labeled with the same letter is the same size.

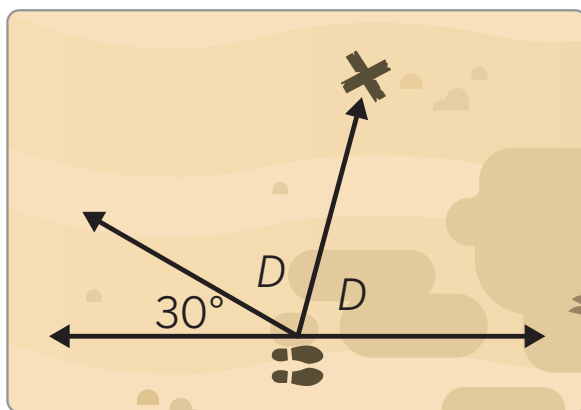
 Show your thinking.

5 angle C



answer: _____

6 angle D

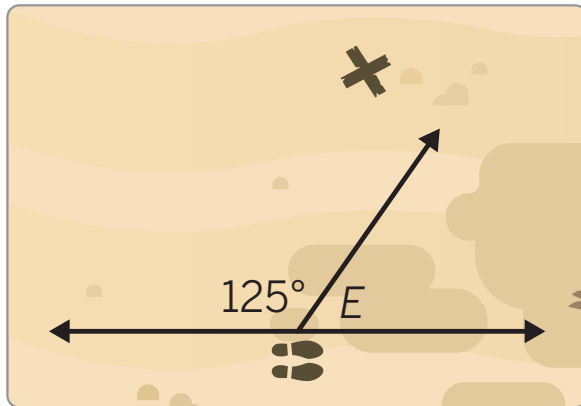


answer: _____

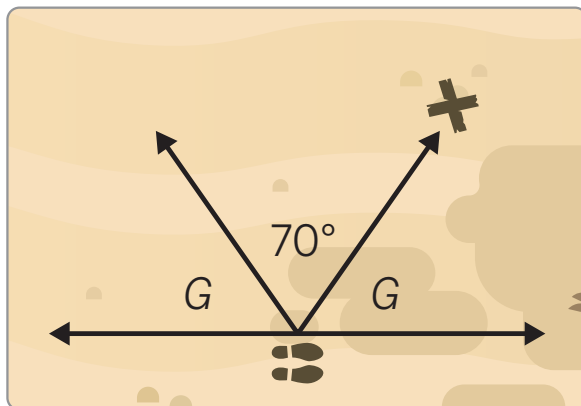
Unknown Angles (continued)

7

 Show your thinking.

angle E 

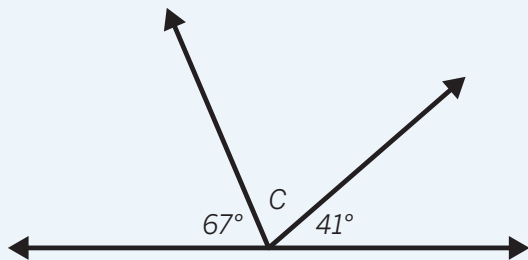
answer: _____

angle G 

answer: _____

Summary 7.11

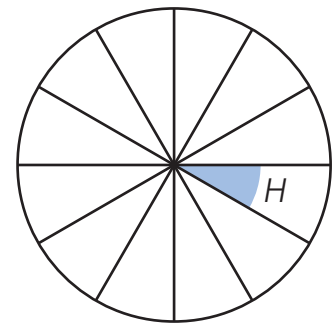
Angles can be composed or decomposed to determine unknown angle measurements.



$$\begin{aligned}67 + 41 + C &= 180 \\67 + 41 &= 108 \\180 - 108 &= 72 \\C &= 72^\circ\end{aligned}$$

Practice 7.11

- 1** The circle is divided into 12 equal parts. What is the measure of angle H ? Explain your thinking.



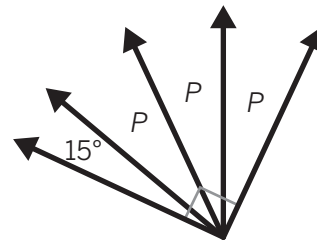
- 2** How many 20° angles does it take to make a circle? Explain your thinking.

Practice 7.11

Name _____ Date _____

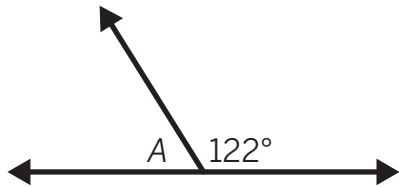
3 What is the measure of angle P ?

- (A) 15°
- (B) 25°
- (C) 30°
- (D) 75°

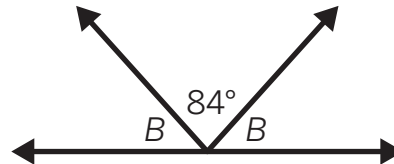


For Problems 4–7, determine the measure of the unknown angle.

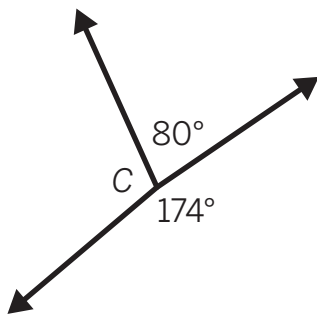
4



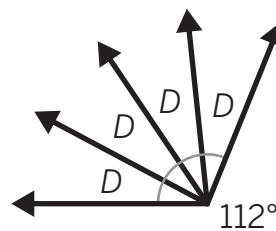
5



6



7



8 A 90° angle is split into 6 equal sections. Determine the measure of each angle.

Show your thinking. _____

answer: _____

Spiral Review

For Problems 9 and 10, determine the value of the expression.

 Show your thinking.

9 $9,234 - 6,789$

answer: _____

10 $2,814 \div 5$

answer: _____

- 11** The typical lifespan of pandas in the wild is 15 years, and the typical lifespan of pandas in human care is 30 years. How many times as long do pandas live in human care than in the wild? Write an equation to represent the story problem.

For Problems 12–15, determine the value of the expression.

12 40×11 _____

13 90×12 _____

14 $4800 \div 6$ _____

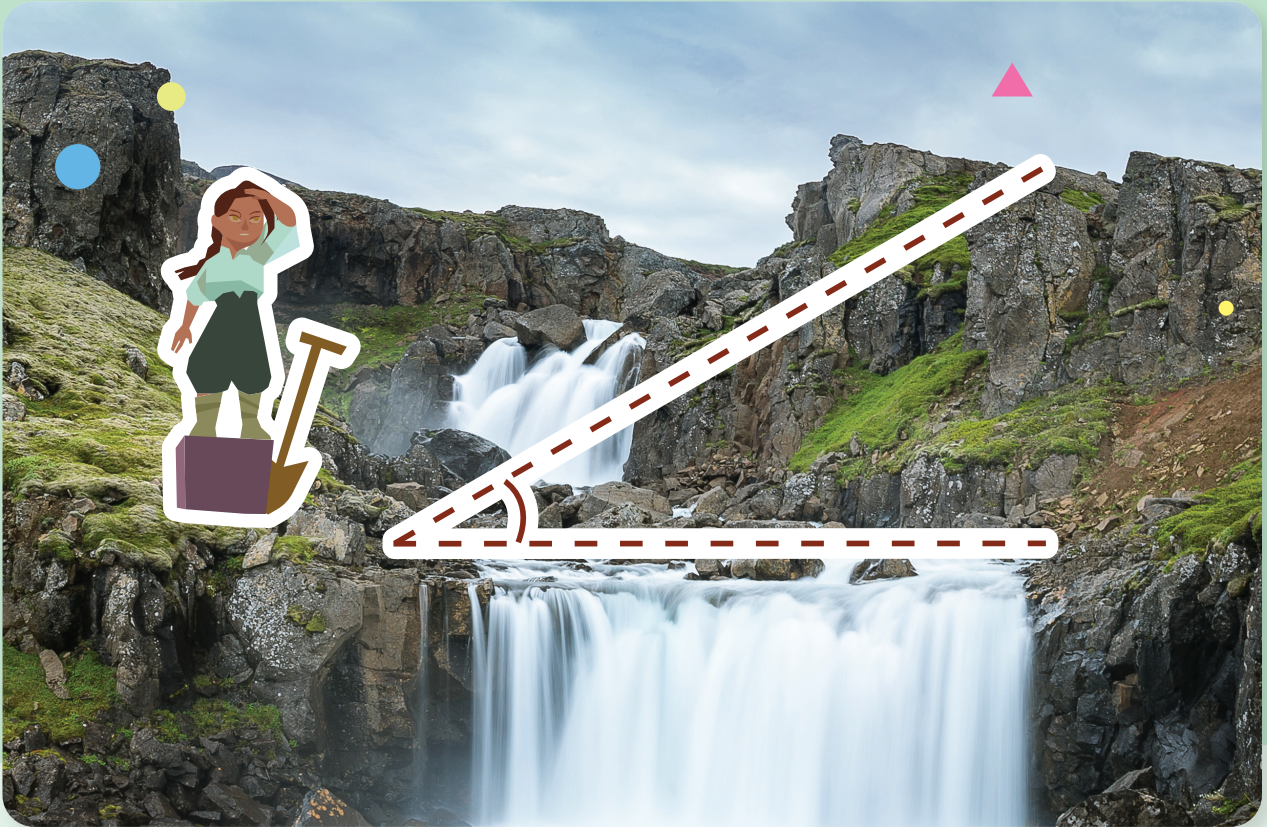
15 $1200 \div 40$ _____



Notes:

Attributes of Shapes

✦ Unit Story: Captain Bogwart's Treasure



Kevin Kopf/Shutterstock.com

How can you use math to help you solve problems outside of math class?

Different Ways to Look at Figures

Let's compare two-dimensional figures to see what attributes they have in common.



Warm-Up



eyes on teacher



We are a math community.

What does it look like and sound like to give respectful feedback?

Activity

1

Card Sort: Shapes

Hands-On

You will be given a set of shape cards.

- Sort the shape cards into 3–6 categories using ideas from earlier lessons, such as parallel and perpendicular sides, angle measurements, and types of angles. Write a title for each of your categories on a separate sticky note.
- Share your categories with another group. Think about the following questions as you take turns listening to each other's explanations.
 - Do their categories make sense to you?
 - Do you have any suggestions or corrections for them to consider?
- Talk with your original group to decide whether you want to make any changes to your categories or groupings based on the feedback you received.

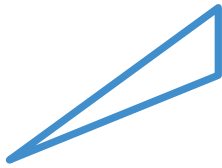

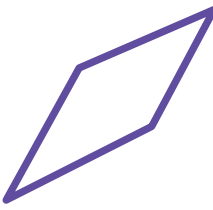

1**Card Sort: Shapes (continued)**

- 4 Once you have completed Problems 1–3 and have a final sort, complete the table. Write a name or description for each of your categories. Then record the letters of the cards in each category.

Category	Cards

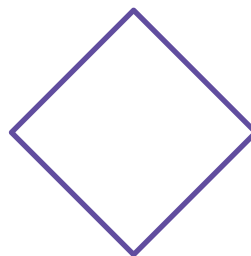
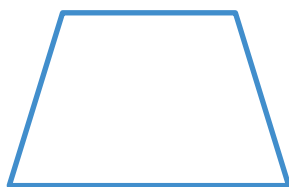
Summary 7.12

You can sort, compare, and classify shapes based on their attributes by looking at the sides, angle measures, or angle types.


No parallel or perpendicular sides	Perpendicular sides	Parallel sides	Parallel and perpendicular sides
			

Practice 7.12

- 1  What attribute do the shapes have in common?



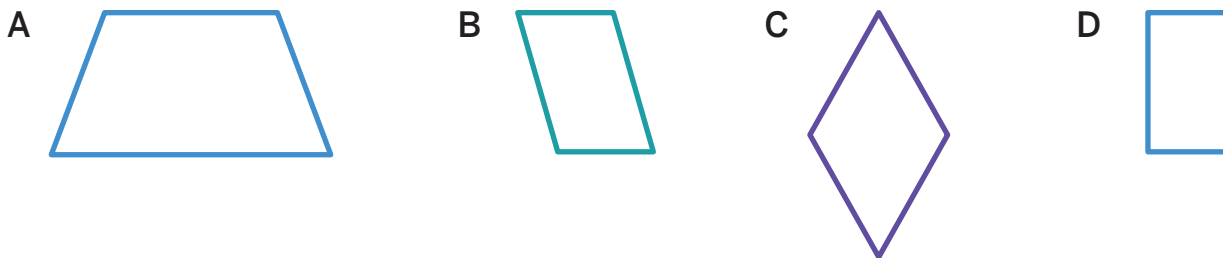
- (A) All 4 shapes have neither parallel nor perpendicular sides.
- (B) All 4 shapes have both parallel and perpendicular sides.
- (C) All 4 shapes have at least 1 pair of parallel sides.
- (D) All 4 shapes have at least 1 set of perpendicular sides.

2  What attribute do the shapes have in common?



- (A) All 4 shapes have neither parallel nor perpendicular sides.
- (B) All 4 shapes have both parallel and perpendicular sides.
- (C) All 4 shapes have at least 1 pair of parallel sides.
- (D) All 4 shapes have at least 1 set of perpendicular sides.

For Problems 3 and 4, use Shapes A–D.



3 Name some attributes that *all* 4 shapes have in common.

4 Name some attributes that only *some* of the shapes have in common.

Spiral Review

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

i Show your thinking.

5 $3,464 + 5,880$

answer: _____

6 $9,191 \times 8$

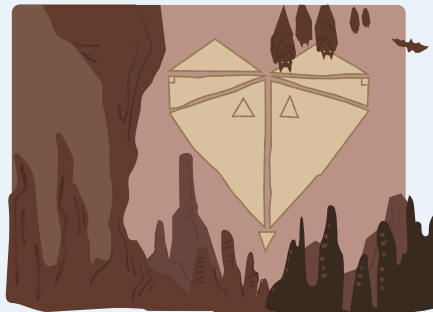
answer: _____

- 7** The area of each continent in square kilometers is shown in the table. Round each area to the nearest 100,000 square kilometers.

Continent	Area (square kilometers)	Rounded value
Asia	31,033,131	
Africa	29,648,481	
Europe	22,134,900	
North America	21,330,000	
South America	17,461,112	
Australia	8,486,460	
Antarctica	13,720,000	

One Way to Look at Triangles

Let's analyze and sort triangles based on their angles.



Warm-Up



eyes on teacher



I can be all of me in math class.

What makes you a mathematician?

Activity

1

Card Sort: Categorizing Triangles

Hands-On

You will be given a set of triangle cards and a protractor.

- Determine *all* the triangles that have each attribute. Record their letter names in the table. If there are no triangles that have a listed attribute, write *none*.

No right angles	1 right angle	More than 1 right angle

1**Card Sort: Categorizing Triangles (continued)**

1 acute angle	2 acute angles	3 acute angles

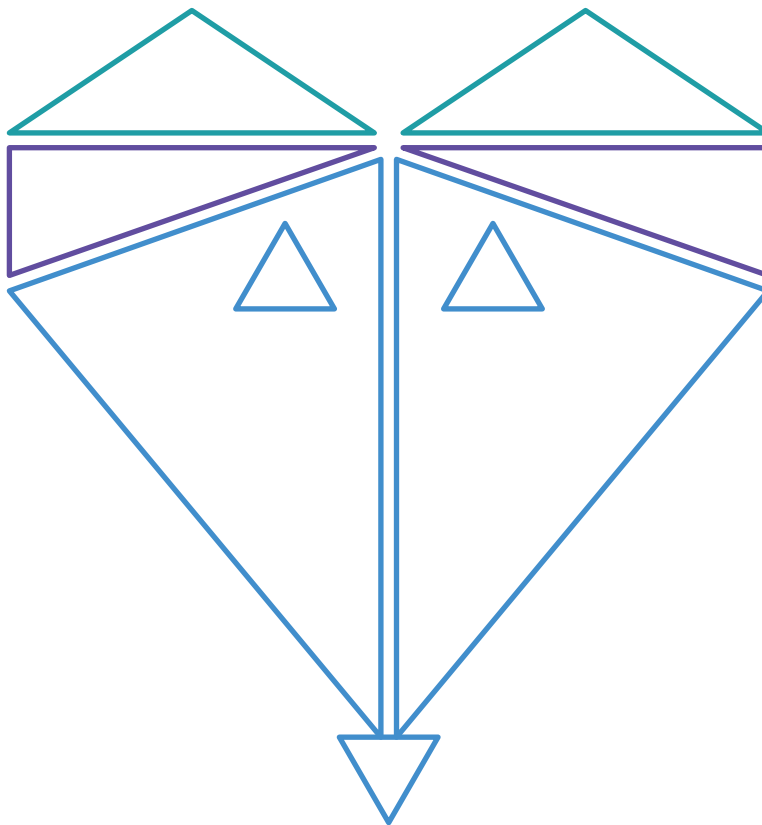
No obtuse angles	1 obtuse angle	More than 1 obtuse angle

2**Discuss** 

Look at your completed table from Problem 1. What do you notice?
What do you wonder?

Searching for Triangles

Here is an image showing some cave art from Heartbreak Caverns.



3 Label each triangle in the cave art using these letters.

- A for an **acute triangle**
- R for a **right triangle**
- O for an **obtuse triangle**

4 **Discuss** 

How did you identify the triangles in Problem 3? How do you know your labels are correct?

2**Searching for Triangles (continued)**

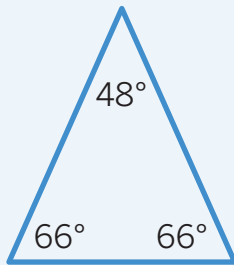
- 5** Draw a cave art design that includes at least 1 of each type of triangle. Use the same labeling system from Problem 3 to label each triangle in your design.

 Draw

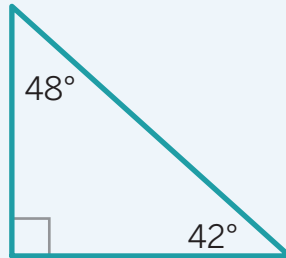
Summary 7.13

You can sort, compare, and classify triangles based on their angles. **Acute triangles** have 3 acute angles, **right triangles** have 1 right angle and 2 acute angles, and **obtuse triangles** have 1 obtuse angle and 2 acute angles.

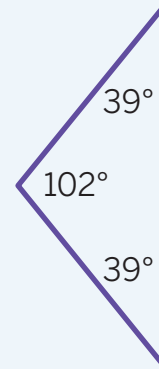
Acute triangle



Right triangle



Obtuse triangle



acute triangle A triangle with 3 acute angles.

Practice 7.13

- 1 Draw a triangle. Label each angle inside the triangle using the letters A for acute, R for right, and O for obtuse.

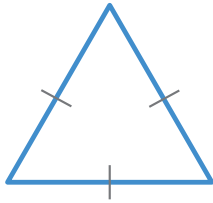
 Draw

Practice 7.13

Name _____ Date _____

2 Which triangles are obtuse? Select *all* that apply.

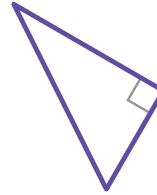
A.



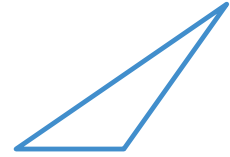
B.



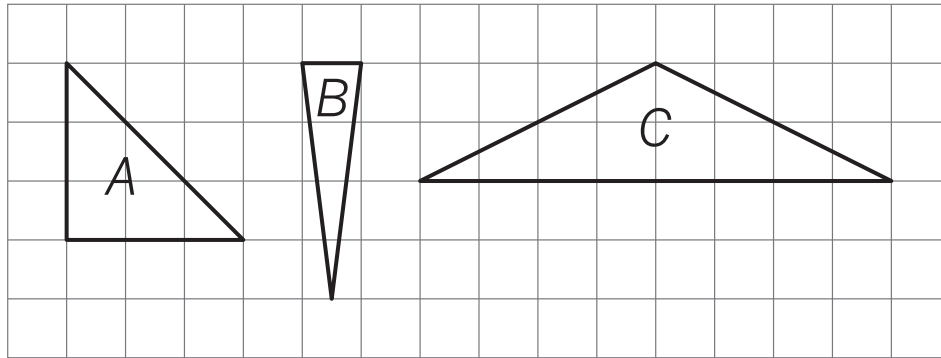
C.



D.



For Problems 3–6, use the triangles shown.



3 Complete the table to show how many of each type of angle are found in the triangles.

	Acute angles	Obtuse angles	Right angles
Triangle A			
Triangle B			
Triangle C			

For Problems 4–6, write the correct name for the triangle.

4 Triangle A _____

5 Triangle B _____

6 Triangle C _____

Spiral Review

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

 Show your thinking.

7 $8,091 - 4,362$

answer: _____

8 $3,676 \div 8$

answer: _____

For Problems 9–12, order the set of numbers from *least to greatest*.

9 0.8, 0.18, 0.78 _____

10 0.26, 0.2, 0.03 _____

11 3.6, 3.56, 3.5 _____

12 2.1, 2.12, 2.09 _____

Another Way to Look at Triangles

Let's analyze and sort triangles based on their sides.



Warm-Up



eyes on teacher



We are a math community.
What differences do you see and appreciate in everyone's cave art designs?

Activity

1

Card Sort: Categorizing Triangles a Different Way

Hands-On

You will be given a set of cards with triangles.

- 1 Identify *all* the triangles that have each attribute. Record their letter names in the table. If no triangles have a listed attribute, write *none*.

No side lengths are the same.	
2 side lengths are the same.	
3 side lengths are the same.	

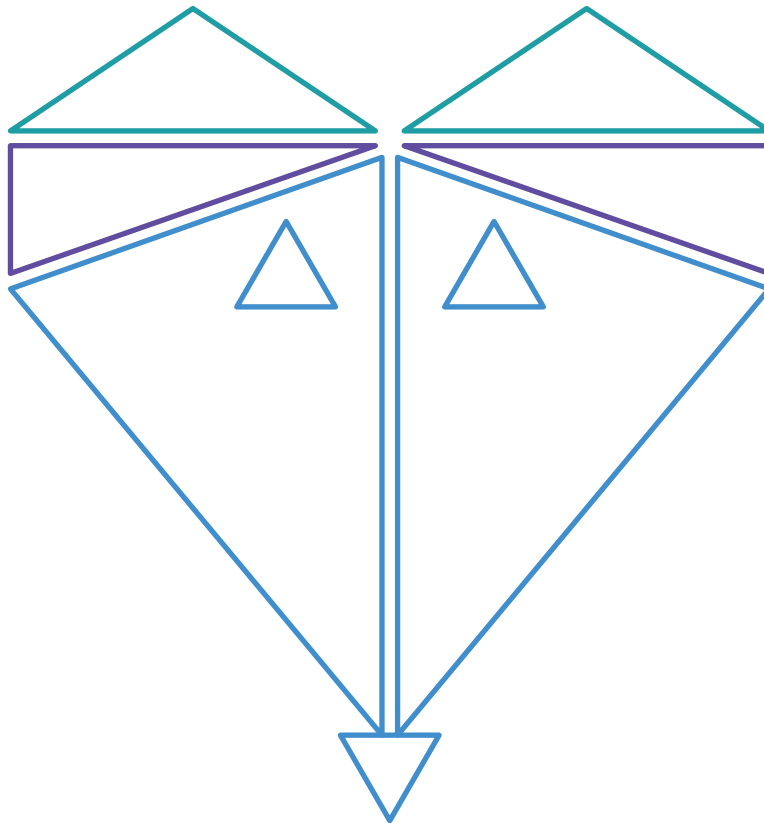
1**Card Sort: Categorizing
Triangles a Different Way (continued)****2****Discuss** 

- Join another pair and compare how you sorted the triangles.
- If you disagree on any triangles, explain your rationale for how you sorted them. Make any adjustments to your card sort that you feel are necessary.



Searching for Triangles

Here is the image of cave art from Heartbreak Caverns again.



3 Label each triangle in Kayla's cave art using these letters.

- *E* for an **equilateral triangle**
- *S* for a **scalene triangle**
- *I* for an **isosceles triangle**

4 **Discuss** 

How did you identify the triangles in Problem 3? How do you know your labels are correct?

2**Searching for Triangles (continued)**

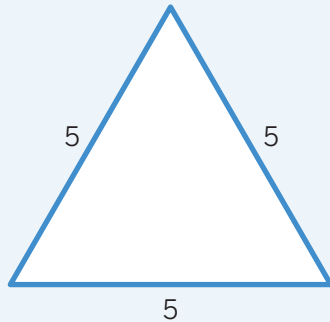
- 5** Draw your own cave art design that includes at least 1 of each type of triangle. Use the same labeling system from Problem 3 to label each triangle in your design.

 Draw

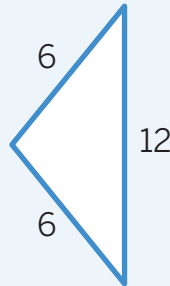
Summary 7.14

You can sort, compare, and classify triangles based on their side lengths. **Equilateral triangles** have 3 equal sides, **isosceles triangles** have 2 equal sides, and **scalene triangles** have no equal sides.

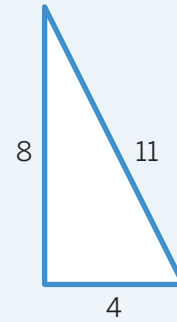
Equilateral triangle



Isosceles triangle



Scalene triangle

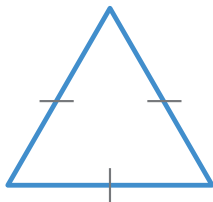


scalene triangle A triangle with no sides that are equal.

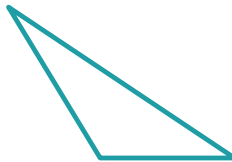
Practice 7.14

1 Which triangles are scalene? Select *all* that apply.

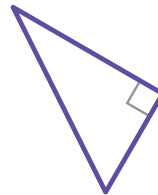
A.



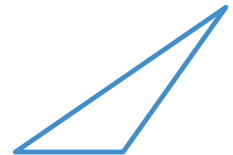
B.



C.



D.



2 How do you know which triangles from Problem 1 are scalene?

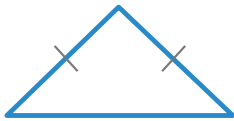
Practice 7.14

Name _____ Date _____

3 Is it possible to draw an equilateral triangle with an obtuse angle? Explain your thinking.

For Problems 4–9, identify the triangle as *equilateral*, *isosceles*, or *scalene*.

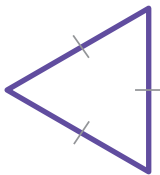
4



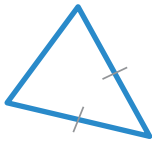
5



6



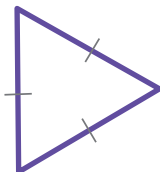
7



8



9



- 10 Describe how you can know if a triangle is isosceles.

Spiral Review

For Problems 11 and 12, determine the value of the expression.

 Show your thinking.

11 $5,598 + 2,036$

answer: _____

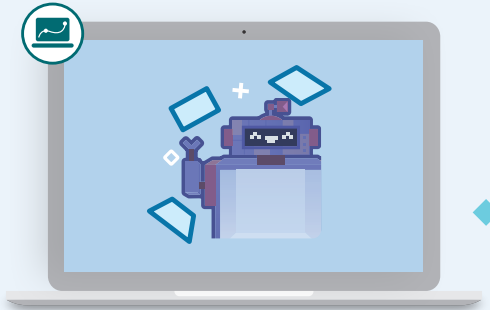
12 24×37

answer: _____

- 13 Diego has a sheet of stickers with 15 rows and 12 stickers in each row. How many stickers are on the sheet?

Quadrilateral Quest

Let's sort and identify quadrilaterals by their different attributes.



We are a math community.
How might it help others when someone shares a mathematical idea, even if they are not sure it will work?

Warm-Up

1 eyes on teacher

Activity

1 Quality Quadrilaterals

2 Discuss

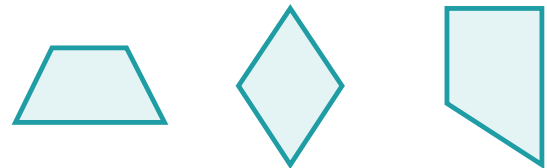
Consider the shapes Rizzo can and cannot eat. Which attributes describe the shapes that Rizzo can eat? Select *all* that apply.

- (A) 2 pair of parallel sides
- (B) 4 right angles
- (C) 4 equal sides
- (D) opposite sides of equal length

Can eat

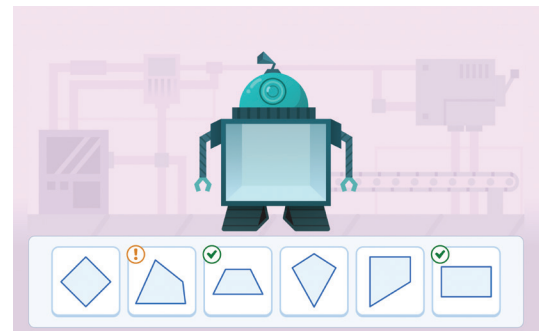


Cannot eat



3 Discuss

Buster is a robot who only eats certain types of quadrilaterals. Here are 2 shapes he will eat and 1 shape he will not eat. Which of the other 3 shapes do you think he will eat? Why?



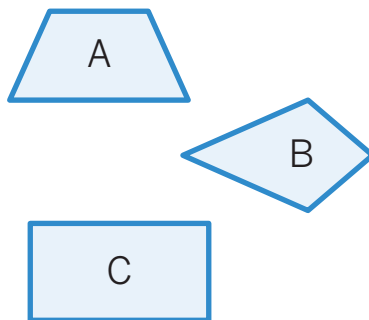
Quality Quadrilaterals (continued)

4

Discuss 

Trapezoids are quadrilaterals with at least 1 pair of parallel sides.
Which shapes are trapezoids? Select *all* that apply.

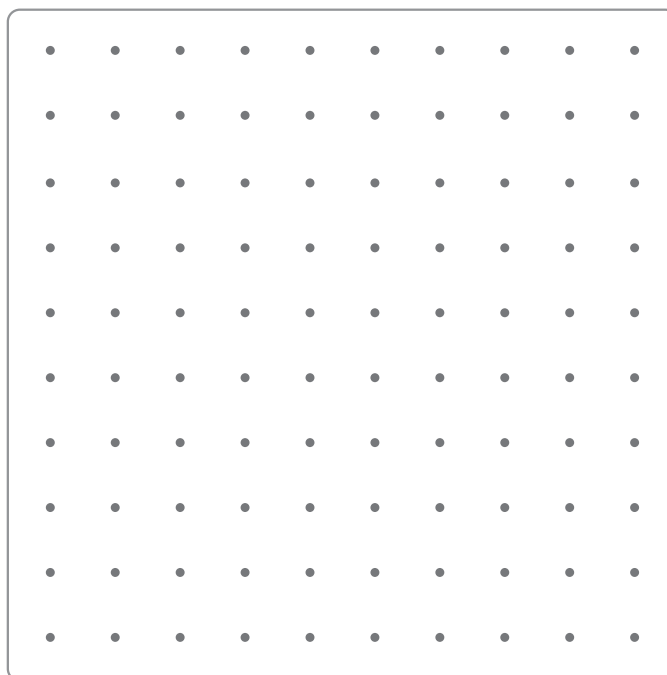
- (A) Shape A
(B) Shape B
(C) Shape C



5

Justify 

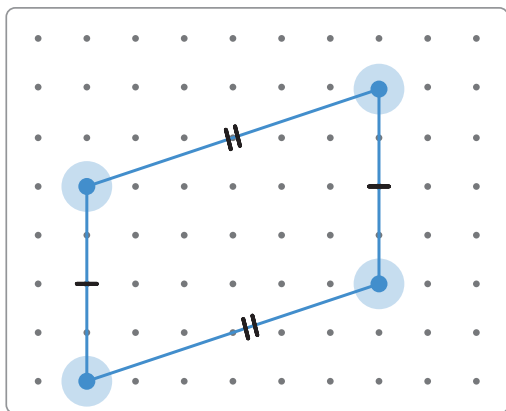
Rizzo and Buster are having breakfast. Rizzo eats trapezoids and Buster eats squares. Draw a shape on the grid that they both can eat. Discuss how you know they can both eat this shape.



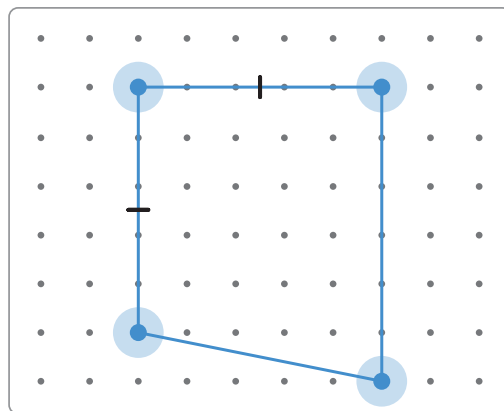
Parallelograms

6

Bertha is a robot who only eats parallelograms. Here is 1 shape she can eat and 1 shape she cannot eat.

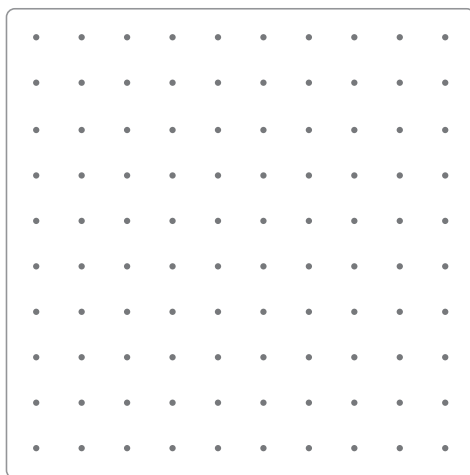


Rhombus **Parallelogram** Rectangle



Rhombus Parallelogram Rectangle

Draw a shape that Bertha can eat.

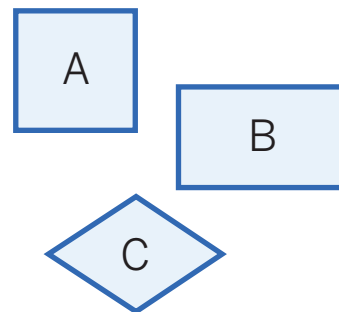


7

Discuss

Parallelograms are quadrilaterals with 2 pairs of parallel sides. Which shapes are parallelograms? Select *all* that apply.

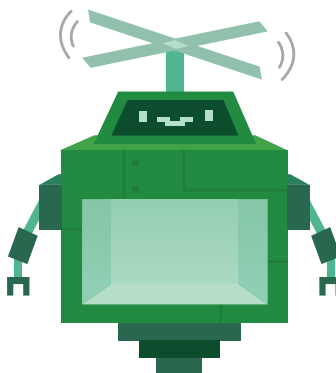
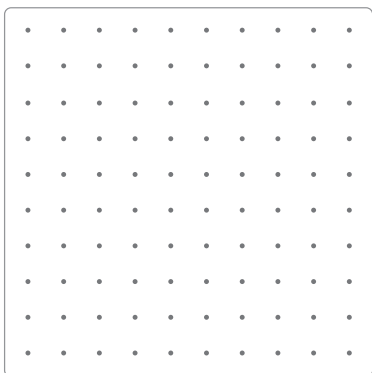
- (A) Shape A
- (B) Shape B
- (C) Shape C



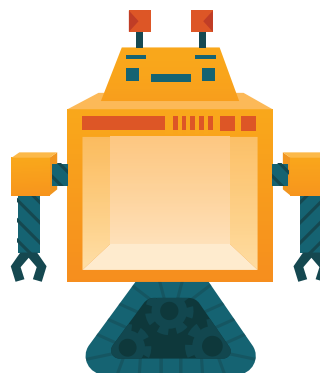
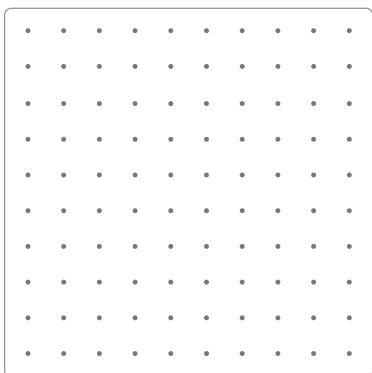
2

Parallelograms (continued)

- 8** Gus eats quadrilaterals that are *not* parallelograms. Draw a shape that Gus can eat. Discuss how you know this shape is not a parallelogram.

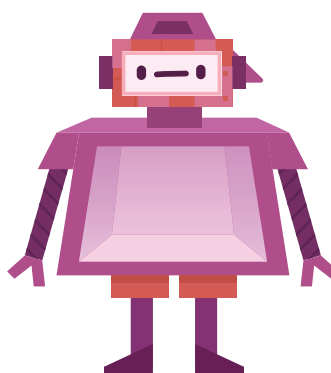
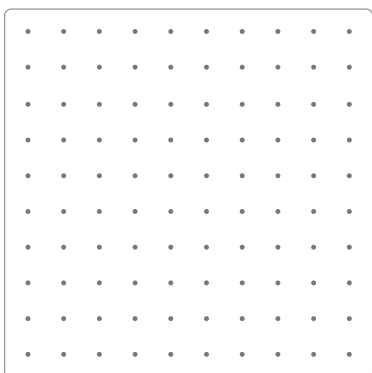


- 9** Freddy eats parallelograms that are also rectangles. Draw a shape that Freddy can eat.



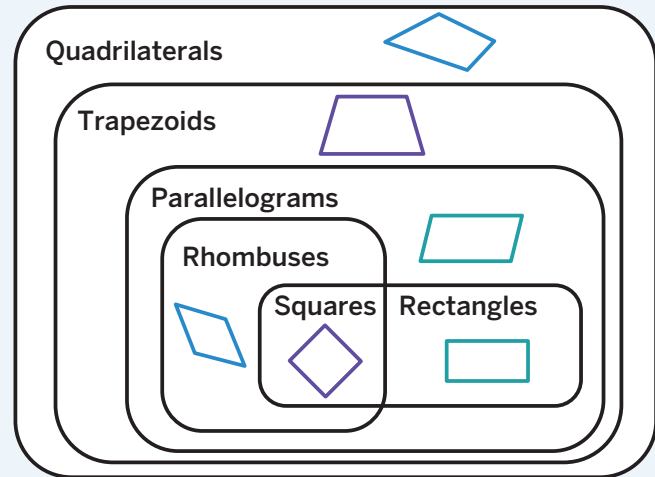
- 10** Discuss 

Ollie wants a rhombus that is *not* a parallelogram. Can you make this for Ollie? Why or why not?



Summary 7.15


Quadrilaterals can be classified and named by angles, side lengths, and whether they have parallel sides. Quadrilaterals with at least 1 pair of parallel sides are **trapezoids**. Quadrilaterals with 2 pairs of parallel sides are **parallelograms**. Some parallelograms can also be described as rhombuses, rectangles, and squares.



parallelogram A quadrilateral with 2 pairs of parallel sides.

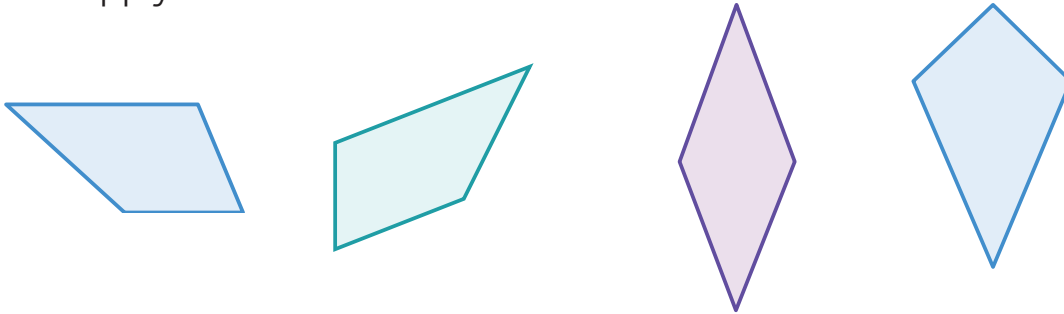
trapezoid A quadrilateral with at least 1 pair of opposite sides that are parallel.

Practice 7.15

- 1  For each attribute, match which shapes it could be describing. Place a check mark in the correct columns.

	Parallelogram	Rhombus	Rectangle	Square
4 right angles				
2 pairs of parallel sides				
All sides are equal length.				
2 pairs of perpendicular sides				

2 Which attributes do these quadrilaterals have in common? Select *all* that apply.



- A. All shapes have 4 equal angles.
- B. All shapes have no pairs of parallel sides.
- C. All shapes have at least 1 obtuse angle.
- D. All shapes have at least 1 acute angle.

For Problems 3 and 4, use the trapezoids.



3 What attributes do *all* the trapezoids share?

4 What is 1 attribute that is different in *at least* one of the trapezoids?

Spiral Review

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

 Show your thinking.

5 $2,942 - 1,758$

6 $6,244 \div 7$

answer: _____

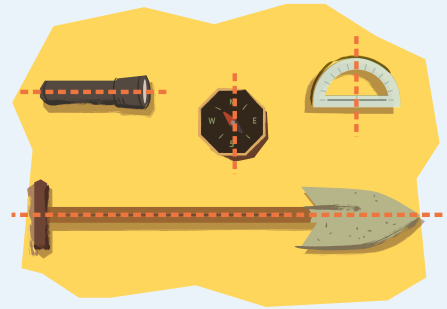
answer: _____

- 7 The table shows the population of various states from the 2020 U.S. Census. Round each population to the nearest 1,000 people.

State	Population	Rounded value
Oklahoma	3,959,353	
Pennsylvania	13,002,700	
Rhode Island	1,097,379	
South Dakota	886,667	
Vermont	643,077	
Wyoming	576,851	

Symmetry in Figures

Let's look at two-dimensional figures that look the same on both sides.



Warm-Up



eyes on teacher



I am a doer of math.

How can you take initiative if you get stuck today?

Activity

1

Perfect Matches

Each diagram represents a piece of paper. Each piece of paper is a different shape. Jada folds each piece of paper once, creating 2 smaller parts. She then sorts the pieces into 2 categories.

The images represent the shapes and folding lines for the pieces of paper in each of her categories.

Study the category names and the figures in each category.

Folding line is a line of symmetry	Folding line is <i>not</i> a line of symmetry

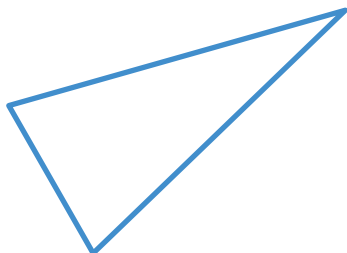
1 Discuss

What is a line of symmetry?

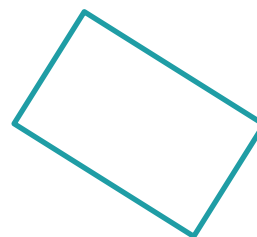
Searching for Symmetry

- 2 Determine whether each figure has a line of symmetry. Draw any lines of symmetry on the figures. At least one of the figures does not have any lines of symmetry.

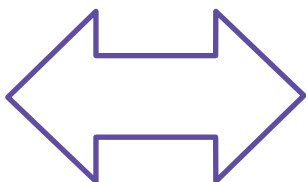
A



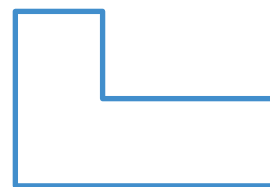
B



C



D



3 **Discuss** 

- For the figures that do not have any lines of symmetry, explain how you know.
- Do any of the figures have more than 1 line of symmetry? How do you know?

4 **Discuss** 

For the figures that do not have any lines of symmetry, explain how you know. Do any of the figures have more than 1 line of symmetry? How do you know?

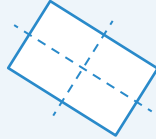
Summary 7.16

A **line of symmetry** divides a figure into 2 parts that are a mirror reflection of one another. A figure that has a line of symmetry is **symmetric**. Some figures may have more than 1 line of symmetry, and some may not have a line of symmetry.

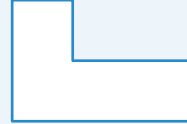
1 line of symmetry



2 lines of symmetry



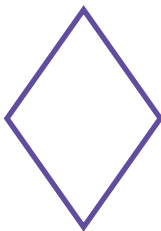
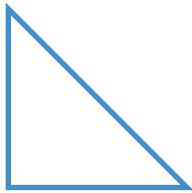
No line of symmetry



symmetric A figure that can be split by a line into 2 matching halves that perfectly mirror each other on both sides of the line. The line that splits the figure is called the line of symmetry.

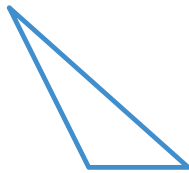
Practice 7.16

1 Draw *all* the lines of symmetry for each figure.

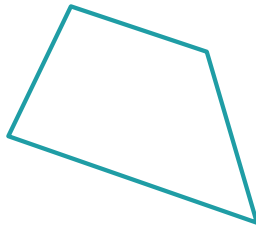


2 Which figures do *not* have a line of symmetry? Select *all* that apply.

A.



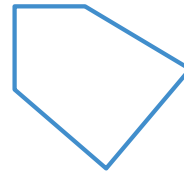
B.



C.



D.



3 Draw *all* the lines of symmetry for each letter. If a letter does not have any lines of symmetry, leave it blank.

T W R

A C G

N H Z

Spiral Review

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

 Show your thinking.

4 $3,073 + 8,987$

answer: _____

5 $7,418 \times 6$

answer: _____

6 Complete the comparison statements using $<$, $>$, or $=$.

	$<$, $>$, or $=$	
0.85		$\frac{9}{10}$
0.1		$\frac{1}{100}$
1.5		$1\frac{5}{10}$
$\frac{4}{100}$		0.04
$\frac{30}{10}$		$\frac{30}{100}$
$\frac{99}{100}$		1
0.06		0.1

Symmetry Synergy

Let's create figures that have lines of symmetry.



Warm-Up

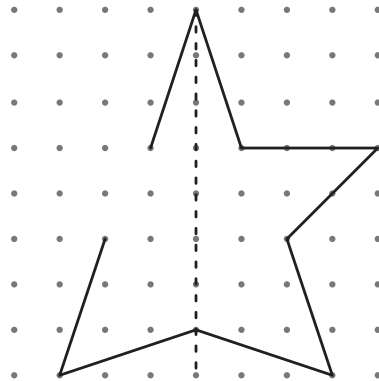
1 eyes on teacher

We have a math community.
How can you learn from your partner or classmates today?

Activity

1 Symmetry Quest

2 Complete the figure so that the dashed line is a line of symmetry for the new figure.



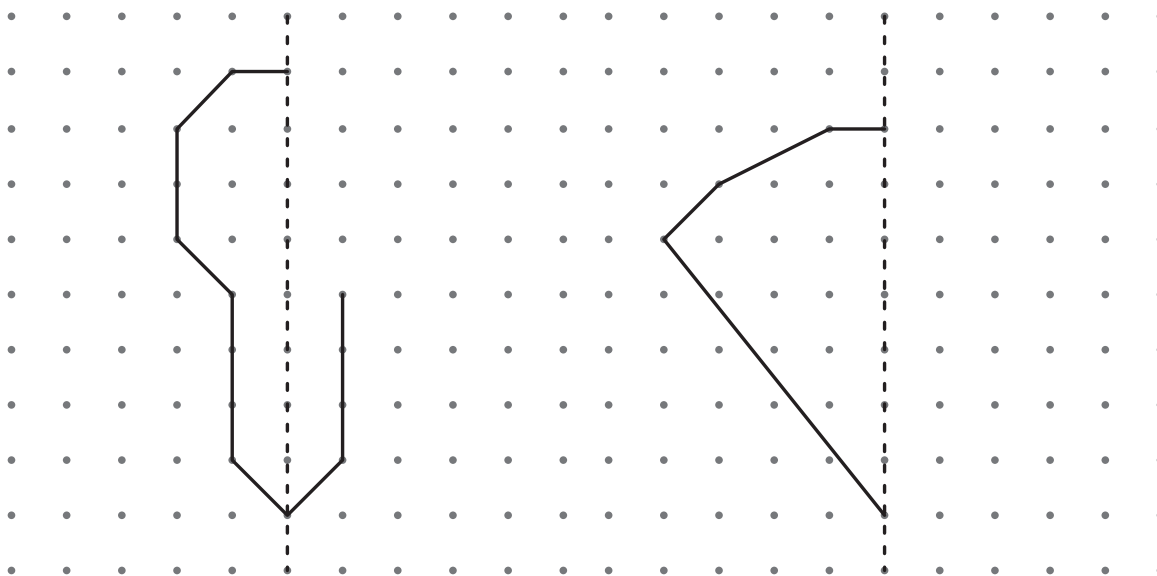
Justify

How do you know the figure you created is symmetric?

1

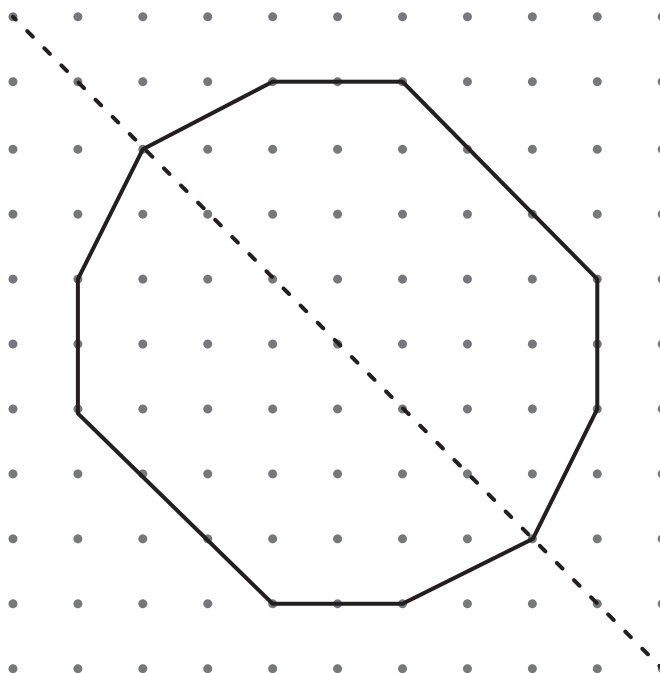
Symmetry Quest (continued)

3 Complete each figure so that the dashed line is a line of symmetry for the new figure.



4 Discuss 

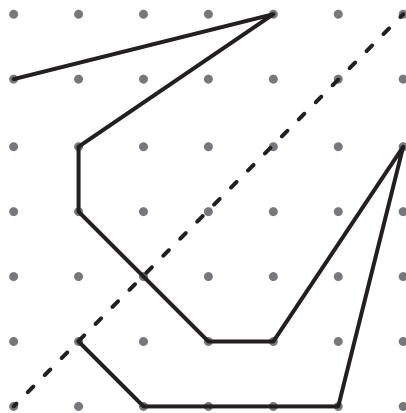
Kayla says this figure has another line of symmetry. Do you agree? Why or why not?



Symmetry Showdown

5

Complete the figure so that the dashed line is a line of symmetry for the new figure.



6

Design a Challenge

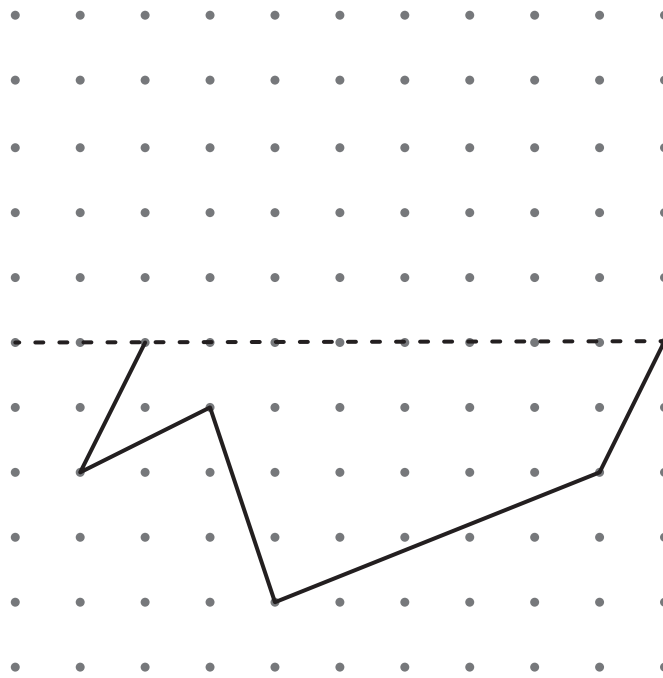
- Use the *Design a Challenge* sheet to choose a line of symmetry.
- Draw half of a geometric figure.
- Trade your *Design a Challenge* sheet with a partner. Use the figure your partner drew to complete the symmetric figure.
- Repeat the challenge with another line of symmetry and a new partner.

Symmetry Showdown (continued)

7

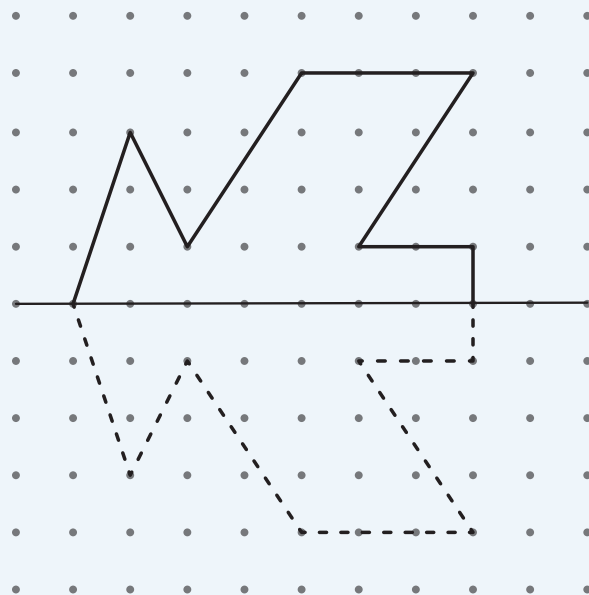
Describe 

How would you complete the symmetric figure?



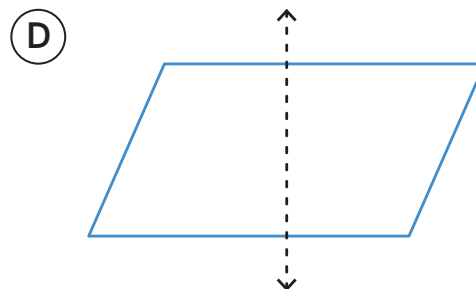
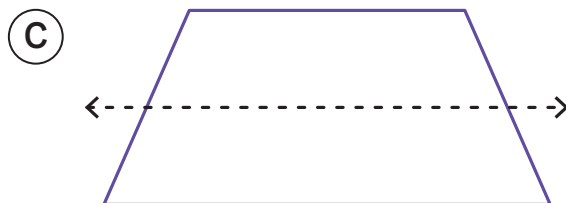
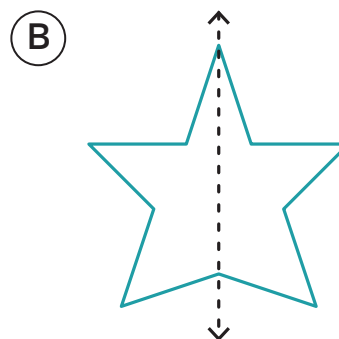
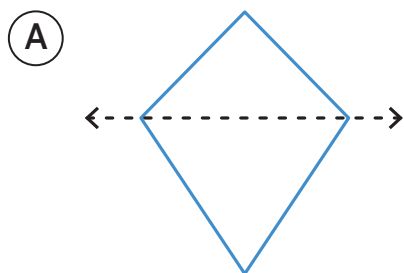
Summary 7.17

When figures are symmetric, the corresponding points in each half of the figure are the same distance from the line of symmetry.



Practice 7.17

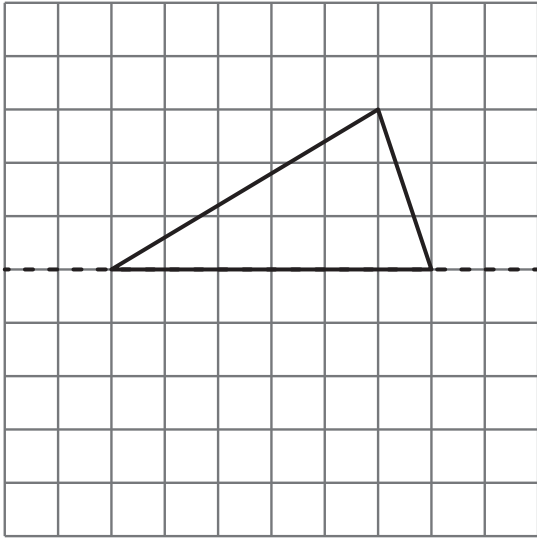
1 Which image shows a line of symmetry?



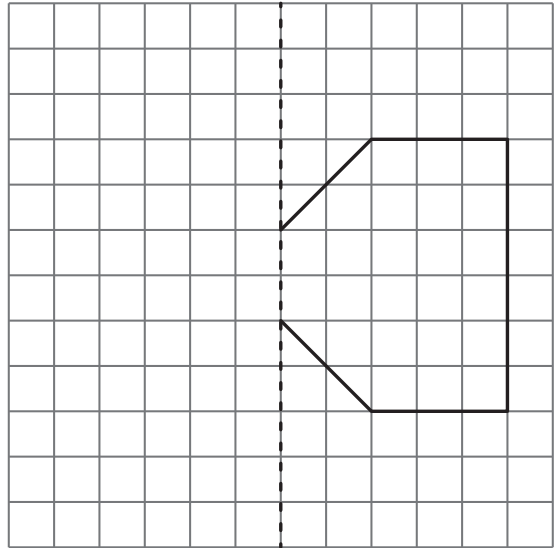
For Problems 2–5, complete the figure so that the dashed line is a line of symmetry for the new figure.

 Draw

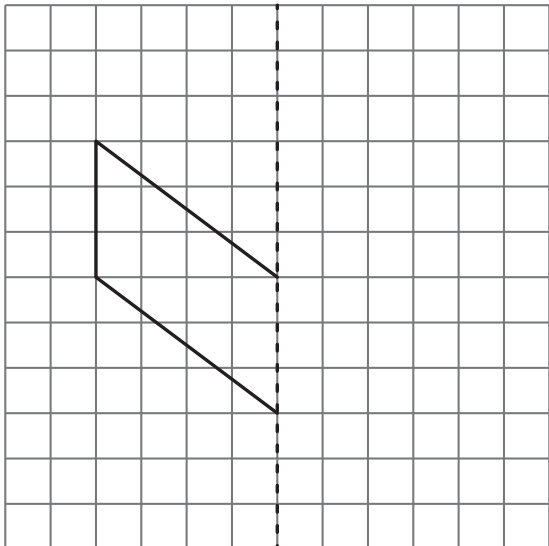
2



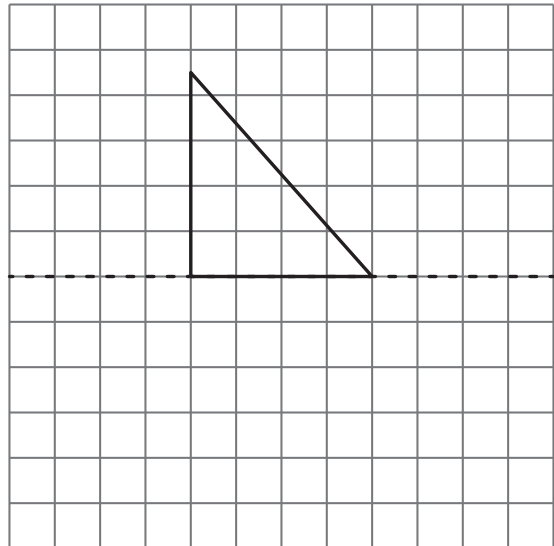
3



4



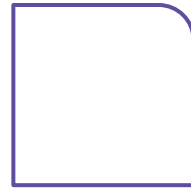
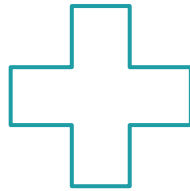
5



Practice 7.17

Name _____ Date _____

- 6 Draw *all* the lines of symmetry for each figure.



Spiral Review

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

 Show your thinking.

7 $9,388 - 6,249$

8 $2,222 \div 5$

answer: _____

answer: _____

- 9 1,371,398 rounded to the nearest multiple of 1,000 is _____.

- 10 1,371,398 rounded to the nearest multiple of 100 is _____.

Angle Measurement and Symmetry

Let's use symmetry to determine unknown measurements in figures.



Warm-Up



eyes on teacher



I can be all of me in math class.

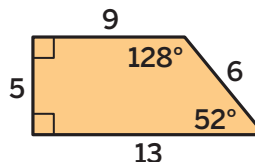
How have you grown as a mathematician this year?

Activity

1

What Was the Original Shape?

The diagram shows the side lengths and angle measurements of half of a shape. You will use the diagram to complete 1 problem from Problems 1–4. Then you will complete Problems 5–6.



The following diagrams represent half of the symmetrical shapes. The dashed lines represent the line of symmetry for each shape.

Draw the other half of each shape to show the full shape. Be as precise as possible.

1

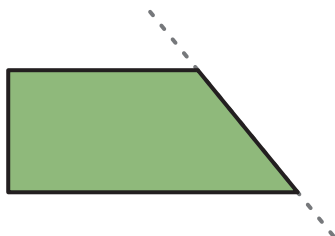


2

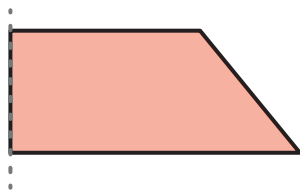


What Was the Original Shape? (continued)

3



4



5 Without measuring, label the measurements of *all* the sides and *all* the angles within each full shape. Be prepared to explain your thinking.

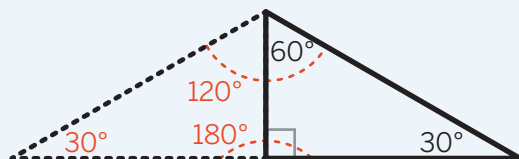
6 **Discuss** 

Share your completed figures with your group.

- Explain how you determined the length of all the sides in your figures.
- Explain how you determined the measurement of each angle in your figures.

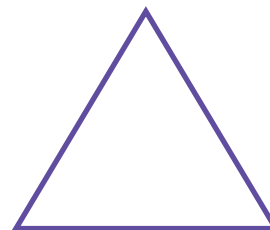
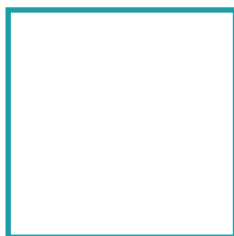
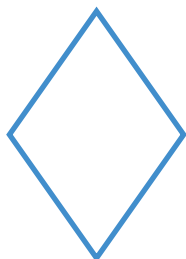
Summary 7.18

You can use a line of symmetry to determine unknown side lengths and unknown angle measures.

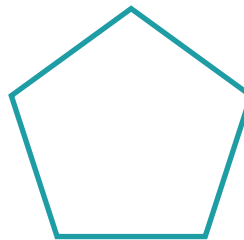
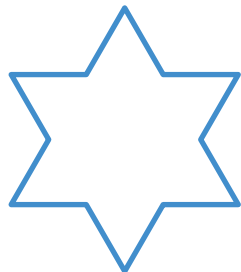


Practice 7.18

- 1 Draw *all* the lines of symmetry in the shapes.



2 Which shape has more lines of symmetry? Explain your thinking.

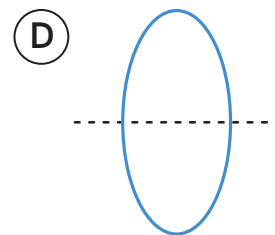
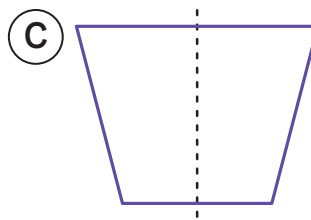
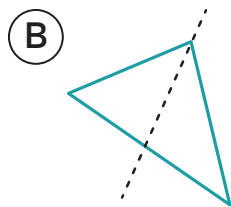
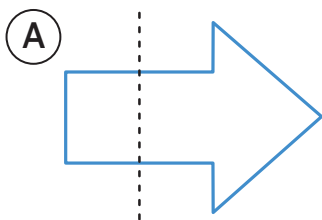


3 Complete the figure so that the dashed line is a line of symmetry for the new figure. Label the measurements of *all* the new angles within the new figure.

 Draw



4 Which image does *not* show a line of symmetry?



Spiral Review

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

Show your thinking.

5 $9,277 + 4,546$

answer: _____

6 45×92

answer: _____

7 An array has 15 columns with 9 dots in each column. Write an equation to represent the total number of dots in the array.



Notes:

Math at Work

Do you like to explore new places? Maps – whether on paper or online – can help you get around. They represent real-life locations using concepts of geometry. A single point represents a specific location, while segments represent roads. Intersecting lines can represent where roads meet and shapes can represent specific landmarks, such as buildings.

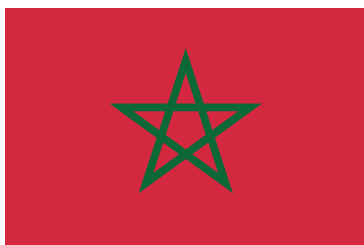
Ibn Battuta was a 14th century Moroccan scholar and explorer. He traveled for almost 30 years, covering about 75,000 miles! This distance is almost 5 times greater than the explorer Marco Polo claimed to have traveled. The places Ibn Battuta explored included as far away as India, China, and southeast Asia.



Image 1 photo credit text, Image 2 photo credit text.

Math at Home

The flag of Morocco has a 5-pointed star in the middle of a red rectangle. How many lines of symmetry does the star have?



Math Mindset

How could you describe how Town Street, Rose Street, and North Street are related on this map?

