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MINISTRY OF EDUCATION

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Reveal MATH®

UAE Edition
Grade 5 Advanced
Volume 2
Student Edition

Mc Graw Hill

Reveal MATH®

Student Edition

Grade 5 • Volume 2

McGraw Hill

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Contents in Brief

Volume 1

1 Math Is... 1

2 Volume 31

3 Place Value and Number Relationships 61

4 Add and Subtract Decimals. 91

5 Multiply Multi-Digit Whole Numbers 133

6 Multiply Decimals 171

7 Divide Whole Numbers 205

Glossary G1

Volume 2

8 Divide Decimals. 1

9 Add and Subtract Fractions. 35

10 Multiply Fractions 81

11 Divide Fractions. 127

12 Measurement and Data 165

13 Geometry 195

14 Algebraic Thinking 229

Glossary G1

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Welcome to *Reveal Math*!

We are excited that you have made us part of your math journey.

Throughout this school year, you will explore new concepts and develop new skills. You will expand your math thinking and problem-solving skills. You will be encouraged to persevere as you solve problems, working both on your own and with your classmates.

With *Reveal Math*, you will experience activities to spark curiosity and challenge your thinking. In each lesson, you will engage in sense-making activities that will make you a better problem solver. You will have different learning experiences to help you build understanding.

We look forward to revealing to you the wonder and excitement of math.

The *Reveal Math* authors

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The *Reveal Math* Authorship Team

McGraw-Hill teamed up with expert mathematicians to create a program centered around you, the student, to make sure each and every one of you can find joy and understanding in the math classroom.

Ralph Connelly, Ph.D.
Authority on the development of early mathematical understanding.

Annie Fetter
Advocate for students ideas and student thinking that fosters strong problem solvers.

Linda Gojak, M.Ed.
Expert in both theory and practice of strong mathematics instruction.

Sharon Gri n, Ph.D.
Champion for number sense and the achievement of all students.

Ruth Harbin Miles, Ed.S.
Leader in developing teachers' math content and strategy knowledge.

Susie Katt, M.Ed.
Advocate for the unique needs of our youngest mathematicians.

Nicki Newton, Ed.D.
Expert in bringing student-focused strategies and workshops into the classroom.

John SanGiovanni, M.Ed.
Leader in understanding the mathematics needs of students and teachers.

Raj Shah, Ph.D.
Expert in both theory and practice of strong mathematics instruction.

Je Shih, Ph.D.
Advocate for the importance of student knowledge.

Cheryl Tobey, M.Ed.
Facilitator of strategies that drive informed instructional decisions.

Dinah Zike, M.Ed.
Creator of learning tools that make connections through visual-kinesthetic techniques.

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Unit 8

Divide Decimals

Unit Opener: STEM in Action 1

IGNITE! Lemonade Stand 2

Lessons

8-1 Division Patterns with Decimals and Powers of 10 . . . 3

8-2 Estimate Quotients of Decimals 7

8-3 Represent Division of Decimals by a Whole Number . . 11

8-4 Divide Decimals by Whole Numbers 15

8-5 Divide Whole Numbers by Decimals 19

8-6 Divide Decimals by Decimals 23

Math Probe Decimal Division 27

Unit Review 29

Fluency Practice 33

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Unit 9

Add and Subtract Fractions

Unit Opener: STEM in Action 35

IGNITE! Fraction Wall 36

Lessons

9-1 Estimate Sums and Di erences of Fractions 37

Math Probe Make an Estimate of the Sum 41

9-2 Represent Addition of Fractions with Unlike Denominators 43

9-3 Add Fractions with Unlike Denominators 47

9-4 Represent Subtraction of Fractions with Unlike Denominators 51

9-5 Subtract Fractions with Unlike Denominators 55

9-6 Add Mixed Numbers with Unlike Denominators . . . 59

9-7 Subtract Mixed Numbers with Unlike Denominators . 63

9-8 Add and Subtract Mixed Numbers with Regrouping . 67

9-9 Solve Problems Involving Fractions and Mixed Numbers 71

Unit Review 75

Fluency Practice 79

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Unit 10

Multiply Fractions

Unit Opener: STEM in Action 81

IGNITE! Folding Fractions on a Strip 82

Lessons

10-1 Represent Multiplication of a Whole Number by a Fraction 83

10-2 Multiply a Whole Number by a Fraction 87

Math Probe Fraction Problems 91

10-3 Represent Multiplication of a Fraction by a Fraction . . 93

10-4 Multiply a Fraction by a Fraction 97

10-5 Determine the Area of Rectangles with Fractional Side Lengths 101

10-6 Represent Multiplication of Mixed Numbers 105

10-7 Multiply Mixed Numbers 109

10-8 Multiplication as Scaling 113

10-9 Solve Problems Involving Fractions 117

Unit Review 121

Fluency Practice 125

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Unit 11

Divide Fractions

Unit Opener: STEM in Action 127

IGNITE! Number Strings 128

Lessons

11-1 Relate Fractions to Division 129

11-2 Solve Problems Involving Division 133

11-3 Represent Division of Whole Numbers by Unit Fractions 137

11-4 Divide Whole Numbers by Unit Fractions 141

11-5 Represent Division of Unit Fractions by Non-Zero Whole Numbers 145

11-6 Divide Unit Fractions by Non-Zero Whole Numbers . . 149

Math Probe Which Expressions Represent the Situation? . . 153

11-7 Solve Problems Involving Fractions 155

Unit Review 159

Fluency Practice 163

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Unit 12

Measurement and Data

Unit Opener: STEM in Action 165

IGNITE! Which Sums Occur Least and Most? 166

Lessons

12-1 Convert Customary Units 167

12-2 Convert Metric Units 171

12-3 Solve Multi-Step Problems Involving Measurement Units 175

12-4 Represent Measurement Data on a Line Plot 179

12-5 Solve Problems Involving Measurement Data on Line Plots 183

Math Probe Line Plots 187

Unit Review 189

Fluency Practice 193

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Unit 13

Geometry

Unit Opener: STEM in Action 195

IGNITE! Tetrominoes 196

Lessons

13-1 Understand the Coordinate Plane 197

13-2 Plot Ordered Pairs on the Coordinate Plane 201

13-3 Represent Problems on a Coordinate Plane 205

13-4 Classify Triangles by Properties 209

13-5 Properties of Quadrilaterals 213

Math Probe Ordered Pairs 217

13-6 Classify Quadrilaterals by Properties 219

Unit Review 223

Fluency Practice 227

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Unit 14

Algebraic Thinking

Unit Opener: STEM in Action 229

IGNITE! 5-4-3-2-1 Challenge 230

Lessons

14-1 Write Numerical Expressions 231

14-2 Interpret Numerical Expressions 235

14-3 Evaluate Numerical Expressions 239

Math Probe Order of Operations 243

14-4 Numerical Patterns 245

14-5 Relate Numerical Patterns 249

14-6 Graphs of Numerical Patterns 253

Unit Review 257

Fluency Practice 261

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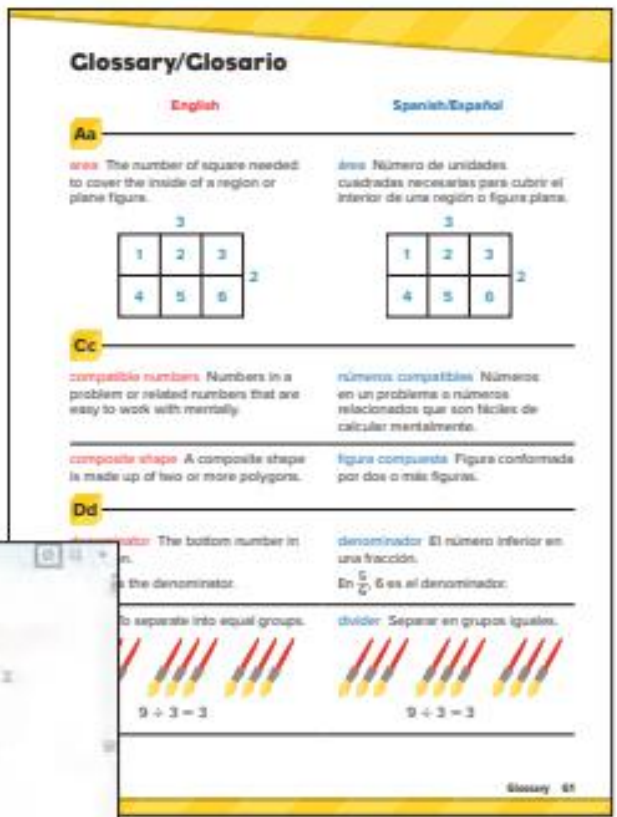
Let's Talk About Math!

Throughout this year, you will explore the language of mathematics as you talk about math with your classmates. You are going to learn many new words this year. Use these resources as you expand your vocabulary.

Glossary

In the back of this book, you will fi d a glossary with defi itions for your reference.



Interactive Glossary

The Interactive Glossary will support you as you work through your Interactive Student Edition and complete assignments online.

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Jump into Learning!

You can fi d all the resources you need from your **Student Dashboard**.

1. Easily access scheduled work or assessments from the To-Do List.
2. View speci c lesson resources throughout the course.
3. Review the previously completed work and see your scores.
4. Access to the Interactive Student Edition and the eToolkit easily with quick links.

You can use your **Interactive Student Edition** to complete assignments, and practice and reference lesson content.

1. Use the slide numbers to nd your page number.
2. Type or draw to work out problems and respond to questions.
3. Check your answers as you go through your assignment.

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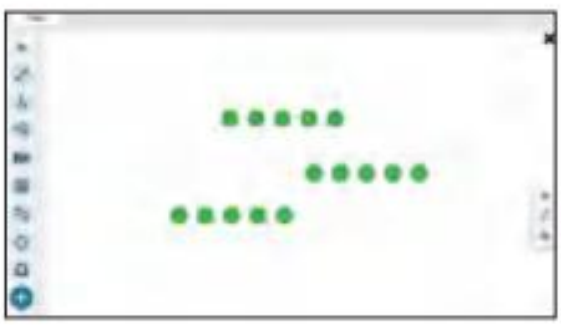
Access Lesson Supports Online!

In addition to your Interactive Student Edition, access these supports online while you practice.

Need an Instant Replay of the Lesson Content?

Math Replay videos off r 1–2 minute overview of the lesson concept to use as a reference while you are practicing or completing your homework.



Virtual Tools to Help You Problem-Solve

You can access the eToolkit at any time from your Student Dashboard. You will have access to the following manipulatives:

- Counters
- Base-Ten Blocks
- Array Builder
- Fraction Model
- Bucket Balance
- Geometry Sketch
- Money
- Fact Triangles
- Number Line
- and more!

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Key Concepts and Learning Objectives

Key Concept Habits of Mind and Classroom Norms for Productive Math Learning

- I can make sense of problems and quantities and represent them di erent ways. (Unit 1)
- I can represent a real-world situation using mathematics. (Unit 1)
- I can construct an argument to explain my thinking with clear and appropriate terms. (Unit 1)
- I can use patterns to develop e cient strategies to solve problems. (Unit 1)
- I can tell my math biography and recognize the behaviors and attitudes that support a productive learning environment. (Unit 1)

Key Concept Operations with Fractions

- I can add, subtract, and multiply fractions, including mixed numbers, with unlike denominators. (Units 9, 10)
- I can fi d the area of a rectangle with fractional side lengths. (Unit 10)
- I can describe multiplication as scaling. (Unit 10)
- I can divide unit fractions by whole numbers and whole numbers by unit fractions. (Unit 11)

Key Concept Operations with Whole Numbers and Decimals

- I can describe the relationship between place value positions. (Unit 3)
- I can use an algorithm to multiply whole numbers. (Unit 5)
- I can divide multi-digit dividends by 2-digit divisors. (Unit 7)
- I can add, subtract, multiply, or divide decimals. (Units 4, 6, 8)
- I can solve word problems involving operations with whole numbers or decimals. (Units 4, 5, 6, 7, 8)

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Key Concept **Measurement and Data**

- I can describe volume is an attribute of solid fi ures. (Unit 2)
- I can measure volume by counting unit cubes. (Unit 2)
- I can calculate the volume of rectangular prisms using formulas. (Unit 2)
- I can fi d the volume of composite solid fi ures. (Unit 2)
- I can convert measurement units within a given measurement system. (Unit 12)
- I can interpret data on a line plot. (Unit 12)

Key Concept **Geometry**

- I can identify and describe features of a coordinate plane. (Unit 13)
- I can graph points on the coordinate plane to solve problems. (Unit 13)
- I can classify 2-dimensional fi ures into categories based on their properties. (Unit 13)

Key Concept **Algebraic Thinking**

- I can write numerical expressions to represent calculations that are described using written statements. (Unit 14)
- I can interpret numerical expressions without evaluating them. (Unit 14)
- I can use the order of operations to evaluate numerical expressions. (Unit 14)
- I can generate two numerical patterns using two given rules. (Unit 14)
- I can identify apparent relationships between corresponding terms in the generated number patterns. (Unit 14)

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Math is...

How would you complete this sentence?

Math is.....

Math is not just carrying out operations and solving equations.

Math is...

- working together
- nding patterns
- sharing ideas
- listening thoughtfully to our classmates
- sticking with a task even when it is a little challenging

In *Reveal Math*, you will develop the habits of mind that strong doers of math have. You will see that math is all around us.

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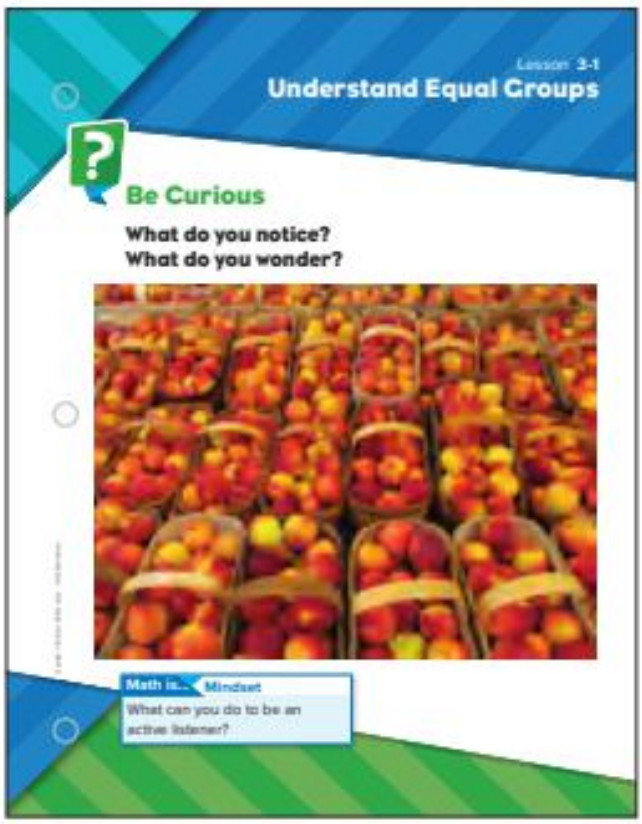
Let's be Doers of Mathematics

Remember, math is more than getting the right answer. It is a tool for understanding the world around you. It is a language to communicate and collaborate. Be mindful of these prompts throughout the year to access the power of math.

1. **Math is... Mine**
   - Mindset
2. **Math is... Exploring and Thinking**
   - Planning
   - Connections
   - Thinking
3. **Math is... My World**
   - In My World
   - Modeling
   - Choosing Tools
4. **Math is... Explaining and Sharing**
   - Explaining
   - Sharing
   - Precision
5. **Math is... Finding Patterns**
   - Patterns
   - Generalizations
6. **Math is... Ours**
   - Mindset



Math is... Mindset

What can you do to be an active listener?

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Explore the Exciting World of STEM!

Ever wonder how math applies in the real world? In each unit, you will learn about a STEM career that engages in mathematics to make a positive impact in society, from protecting our parks to exploring outer space. Throughout the unit, you will have opportunities to dig into the STEM career through digital simulations and projects.

STEM Career Kid: Meet Hiro

Let the STEM Career Kid introduce their career and talk about their respective job responsibilities.

Math In Action: Ocean Engineer

Watch the Math in Action to see how the math you are learning applies to the real world and help problem solve.

Hi, I'm Hiro.

I want to know everything about our oceans. The ocean has amazing plants and animals. I want to be an ocean engineer when I grow to make sure our oceans are protected and everyone can enjoy them.

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Unit 8

Divide Decimals

Focus Question

What strategies can I use to divide with decimals?

Hi, I'm Saffron.

I'm looking forward to becoming a pastry chef. It's important to get a good price on ingredients! Flour comes in five-pound bags, and each bag costs $2.50. I can divide the price by five to find the cost per pound. Chefs often need to divide decimals.

Name _____

Lemonade Stand

You sell lemonade in these three sizes:

Small Glass 0.2 liter

Regular Glass 0.25 liter

Large Glass 0.75 liter

You make the lemonade in jugs of these three sizes:

2-liter Jug

3-liter Jug

5-liter Jug

1. Write some mathematical questions that come to mind about the lemonade stand.

2. Pick one size of glass and one size of jug. How many of the glasses can be filled with a full jug of lemonad ? Explain your thinking.

3. Ask a partner what size of glass and jug they selected and how many glasses they thought could be filled. Have your partner explain their answer.

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Lesson 8-1

Division Patterns with Decimals and Powers of 10

Be Curious

Is It Always True?

When you divide, the quotient is less than the dividend.

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Math is... Mindset

What helps you understand a problem situation?

Learn

A rope that is 37.5 meters long is being cut into pieces of equal length.

How can you determine the unknown values in the table?

Number of Pieces	Length of Each Piece (m)
100	
10	
1	37.5
	0.1
	0.01

You can use the relationship between place-value positions to determine the unknown values.

Find the length of each piece.

$37.5 \div 1 = 37.5$

$37.5 \div 10 = 3.75$ — digits shift 1 place to the right

$37.5 \div 100 = 0.375$ — digits shift 2 places to the right

Find the number of pieces.

$37.5 \div 1 = 37.5$

$37.5 \div 0.1 = 375$ — digits shift 1 place to the left

$37.5 \div 0.01 = 3{,}750$ — digits shift 2 places to the left

You can use patterns to determine the quotient of a decimal divided by a power of 10.

Math is... Structure

How does dividing by powers of 10 compare to multiplying by powers of 10?

Work Together

Oscar has $1.20. If he has only dimes, how many dimes does he have? If he has only pennies, how many pennies does he have? Explain your thinking.

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On My Own

Name _____

What are the quotients? Use a pattern to solve and explain your thinking.

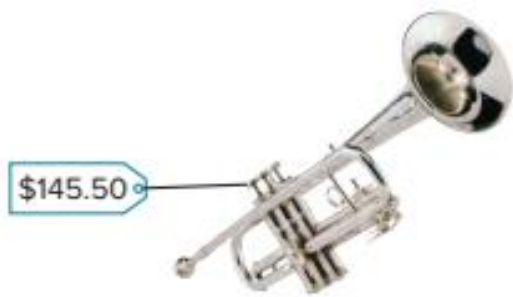
1. $64.2 \div 100 =$ _____
   $64.2 \div 10 =$ _____
   $64.2 \div 1 =$ _____
   $64.2 \div 0.1 =$ _____
   $64.2 \div 0.01 =$ _____

2. $7.5 \div 100 =$ _____
   $7.5 \div 10 =$ _____
   $7.5 \div 1 =$ _____
   $7.5 \div 0.1 =$ _____
   $7.5 \div 0.01 =$ _____

What is the quotient?

3. $91.4 \div 0.1 =$ _____
4. $55.8 \div 0.01 =$ _____
5. $50.5 \div 0.01 =$ _____
6. $33.2 \div 0.1 =$ _____
7. $16.4 \div 10 =$ _____
8. $444.8 \div 100 =$ _____

9. Elisha is buying a trumpet. She will make 10 equal payments to pay for the trumpet. How much will each payment be?



10. Danny walked 567.3 miles in 100 days. Michelle walked 567.3 miles by walking 0.1 mile each day. Who walked for more days? Who walked farther each day? Explain.

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11. Bryson's bicycling club goes on a long ride 10 Saturdays of every year. What was the average distance they rode each trip last year?

12. Error Analysis Paul has 32.4 milliliters of solution. He uses 0.1 milliliter of solution for each experiment. Paul states that he can complete 3.24 trials using all of his solution. How do you respond to him?

13. Extend Your Thinking Find the value of x that makes the equation true. Explain how you know.

$7 \div 0.01 = 700 \div x$

Reflect

How does the relationship between place-value positions help you divide decimals by powers of 10?

Math is... Mindset

What helped you understand a problem situation today?

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Lesson 8-2

Estimate Quotients of Decimals

Be Curious

What questions can you ask?

A theater teacher is making costumes for the spring musical. Each costume uses some of this fabric.

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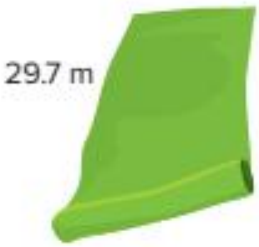
Math is... Mindset

What do you do to stay focused on your work?

Learn

A theater teacher is making costumes for the spring musical.

Each costume uses 0.5 meter of this fabric.



About how many costumes can the teacher make using all the fabric?

The equation $29.7 \div 0.5 = c$ can represent the problem.

You can use compatible numbers to estimate the quotient.

$$29.7 \div 0.5$$
$$\boxed{\times 10} \quad \boxed{\times 10}$$
$$297 \div 5$$

Multiply by a power of 10 to make whole numbers.

$$297 \div 5$$
$$300 \div 5 = 60$$

Use 300 and 5 to estimate the quotient.

The quotient of $29.7 \div 0.5$ is about 60.

The teacher can make about 60 costumes.

Math is... Quantities

How can you determine if an estimate is less than or greater than the actual quotient?

You can use compatible numbers to estimate quotients of decimals. Sometimes, it is helpful to first multiply by a power of 10 to write an expression with whole numbers.

Work Together

A car wash uses 247.5 liters of soap on a weekday. 5.7 liters of soap are used per car. About how many cars go to the car wash each weekday?

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On My Own

Name _____

Estimate the quotient.

1. $4.42 \div 0.81 = x$

2. $36.8 \div 5.7 = d$

3. $19.73 \div 3.21 = c$

4. $5.4 \div 0.25 = m$

Which is a reasonable calculated quotient for each expression?

5. $7.78 \div 0.84 = d$
   - A. 92
   - B. 9.2
   - C. 0.92
   - D. 1.92

6. $23.4 \div 3.2 = s$
   - A. 7.3
   - B. 73.3
   - C. 70.3
   - D. 780.3

7. $4.2 \div 0.96 = b$
   - A. 43.75
   - B. 33.75
   - C. 4.3
   - D. 0.43

8. $13.2 \div 7.4 = p$
   - A. 1.7
   - B. 10.7
   - C. 17.2
   - D. 170.3

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9. Laraine has $13 to spend.

   a. If she buys only songs, about how many songs can she download?

   b. If she buys only games, about how many games can she download?

10. **Error Analysis** Tess calculated that the quotient for the division expression 10.5 ÷ 2.1 is 0.5. She says that her calculation is reasonable. How do you respond to Tess?

11. Janet has $15.37 to spend on bus fare for school. Each bus ride she takes costs $2.25. About how many bus rides can she take with the amount of money she has?

12. **Extend Your Thinking** Write a division expression with decimals that has an estimated quotient of 6.

Reflect

How did you apply what you already know about estimation to estimating the quotients of decimals?

Math is... Mindset

What helped you stay focused on your work?

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Lesson 8-3

Represent Division of Decimals by a Whole Number

Be Curious

What question could you ask?

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Math is... Mindset

What can you do today to build a relationship with a classmate?

Learn

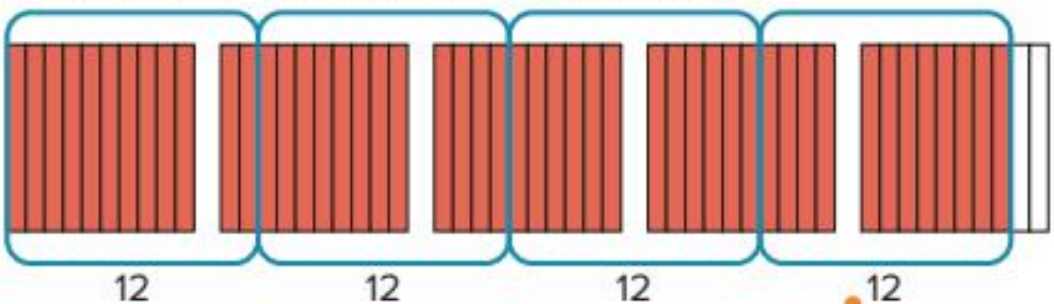
Dakotah has $4.80 and wants to put the same amount in each bank.

How much money should Dakotah put in each bank?

You can use a representation to help you solve the problem.

Use decimal grids to show 4.8.

Partition 4.8, or 48 tenths, into 4 equal groups.



There are 12 tenths in each of the 4 groups.

$4.8 \div 4 = 1.2$

Dakotah should put $1.20 in each bank.

You can use decimal grids to represent dividing a decimal by a whole number.

Math is... Modeling

How do decimal grids help you understand dividing decimals by a whole number?

Work Together

Gina has 1.83 kilograms of trail mix that she will put into 3 bags, each with the same amount of trail mix. How much will each bag weigh?

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On My Own

Name _____

What is the quotient? Use decimal grids to solve.

1. $3.5 \div 7 =$ _____

2. $4.53 \div 3 =$ _____

3. $2.04 \div 4 =$ _____

4. $2.8 \div 2 =$ _____

5. $3.9 \div 3 =$ _____

6. $6.9 \div 3 =$ _____

7. $0.72 \div 8 =$ _____

8. $2.4 \div 4 =$ _____

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9. Six friends are going to run a relay race that is 3.12 miles long. Each friend will run an equal distance. How many miles will each friend run?

10. A street is 6.3 miles long. Workers partition the street into 3 equal parts for a renovation project. How long is each part?

11. **STEM Connection** Saffron measured out 6.5 cups of flou . She plans to use an equal amount of flour to make 5 batches of cupcakes. How many cups of flour will be in each batc ?

12. **Extend Your Thinking** How does knowing how to divide whole numbers help you divide a decimal by a whole number? Explain your thinking.

Reflect

How is dividing a decimal by a whole number similar to or different from dividing whole numbers?

Math is... Mindset

What helped you to build a relationship with a classmate today?

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Lesson 8-4

Divide Decimals by Whole Numbers

Be Curious

Which doesn't belong?

1.2

12 tenths

12 hundredths

120 hundredths

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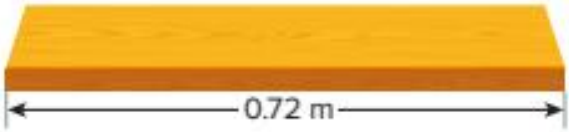
Math is... Mindset

How can you understand your feelings?

Learn

Ashley is going to cut this piece of wood into 3 pieces of equal length.

What will be the length of each piece?



The equation $0.72 \div 3 = w$ can represent the problem.

You can use an equivalent representation to help you solve the equation.

equivalent representations

$0.72 \div 3 = w$

72 hundredths $\div$ 3 = 24 hundredths

So, $0.72 \div 3 = 0.24$.

Each piece of wood is 0.24 meter long.

Math is... Generalizations

How is using equivalent representations like using extended division facts?

You can use place-value understanding and equivalent representations to divide a decimal by a whole number.

Work Together

Amelia has 3.10 cubic inches of potting soil that she will put into 5 seedling pots, each with the same amount of soil. How much soil will be in each pot?

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On My Own

Name _____

1. Which shows an equivalent representation of the expression 0.36 ÷ 3?
   - **A.** 36 ÷ 3
   - **B.** 36 tenths ÷ 3
   - **C.** 36 hundredths ÷ 3
   - **D.** 0.36 ÷ 0.3
2. Which shows an equivalent representation of the expression 2.16 ÷ 4?
   - **A.** 216 ÷ 4
   - **B.** 21.6 ÷ 4
   - **C.** 216 tenths ÷ 4
   - **D.** 216 hundredths ÷ 4

What is the quotient?

3. 0.24 ÷ 8 = _____
4. 0.63 ÷ 9 = _____
5. 0.96 ÷ 6 = _____
6. 0.84 ÷ 4 = _____
7. 1.26 ÷ 7 = _____
8. 2.25 ÷ 5 = _____
9. 3.18 ÷ 3 = _____
10. 4.52 ÷ 4 = _____

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11. Three friends equally split the cost of a large bag of popcorn. The total cost was $6.12. How much did each person have to pay?

12. **STEM Connection** Saffron is using 4.5 cups of sugar to make cookies. She is making 5 batches. How many cups of sugar will be in each batch?

13. A piece of ribbon is 0.64 meter long. Kylie is going to cut it into 4 equal pieces. How long will each piece be?

14. **Extend Your Thinking** Solve the following equations.

$0.24 \div 3 =$ _____

$0.24 \div 30 =$ _____

$0.24 \div 300 =$ _____

What do you notice about the divisors and quotients?

Reflect

How can you use your understanding of place value and equivalent representations to divide decimals by whole numbers?

Math is... Mindset

How have you worked to understand your feelings?

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Lesson 8-5

Divide Whole Numbers by Decimals

Be Curious

What do you notice?
What do you wonder?

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Math is... Mindset

How can you recognize and understand how others are feeling?

Learn

Anna has $3 in quarters.

How many quarters does she have?

One Way Use decimal grids.

$3 \div 0.25 = q$

Partition 3 into groups of 25 hundredths.

There are 12 groups of 25 hundredths.

$3 \div 0.25 = 12$

Math is... Structure

How is using powers of 10 to write an equivalent equation similar to the way you round decimal quotients? How is different?

Another Way Multiply by a power of 10.

You can multiply the dividend and divisor by 10^2.

$$3 \div 0.25 = q$$
$$\downarrow \qquad \downarrow$$
$$300 \div 25 = 12$$

$3 \div 0.25 = 12$

Anna has 12 quarters.

You can use decimal grids to divide a whole number by a decimal.
You can also multiply by a power of 10 to divide by a decimal.

Work Together

A restaurant owner ordered 75 meters of foil to wrap sandwiches. She uses 0.3 meter to wrap one sandwich.

How many sandwiches can she wrap with the foil she ordered?

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On My Own

Name _____

What is the quotient? Tell which strategy you used.

1. $6 \div 0.2 =$ _____

2. $84 \div 1.2 =$ _____

3. $9 \div 0.6 =$ _____

4. $56 \div 3.5 =$ _____

Solve each problem. Then, explain your solution.

5. Darren has a cooler with 9 liters of lemonade. He pours 0.3 liter of lemonade into each glass. How many glasses of lemonade can Darren fill

6. Mr. Ramirez bought a watermelon that weighs 12 pounds for a picnic. He cuts it into pieces that each weigh 1.5 pounds. How many pieces of watermelon can Mr. Ramirez cut?

7. A grocery store got a delivery of 24 pounds of almonds. They package the almonds into containers with 0.75 pound of almonds in each. How many containers can they fill with almond ?

8. Melissa has $30 to spend on apples from a local apple orchard. How many pounds of apples can Melissa buy?

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9. **Error Analysis** Mario says that $28 \div 0.7 = 0.4$. Do you agree or disagree? Explain how you know.

10. A car drove 104 miles in 1.6 hours. If the speed of the car was the same for the entire trip, how fast did the car go? How do you know?

11. Write a real-life problem that involves dividing a decimal by a whole number. Solve the problem using a representation.

12. **Extend Your Thinking** Is the quotient of $52 \div 1.04$ less than or greater than 52? How do you know? What is the quotient?

Reflect

How do powers of 10 help you divide by a decimal?

Math is... Mindset

What helped you recognize and understand how others were feeling?

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Lesson 8-6

Divide Decimals by Decimals

Be Curious

What do you notice?
What do you wonder?

$$1{,}000 \div 500 = 2$$

$$100 \div 50 = 2$$

$$10 \div 5 = 2$$

$$1.0 \div 0.5 = 2$$

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Math is... Mindset

What helps you want to do your best work?

Learn

A playground is rectangular in shape.

How can you determine the length of the playground?

The equation $199.5 \div 9.5 = l$ can represent the problem.

You can multiply the dividend and divisor by a power of 10 to help you solve the equation.

Multiply by 10 | Multiply by 10

$$199.5 \div 9.5 = l$$

$$1{,}995 \div 95 = l$$

Math is... Precision

How do you choose the power of 10 to use?

Use the partial quotients strategy to divide.

	20	1
95	1,995 −1,900 95	95 −95 0

$1{,}995 \div 95 = 21$

$199.5 \div 9.5 = 21$

The length of the playground is 21 meters.

To divide a decimal by a decimal, you can multiply by a power of 10, and then use partial quotients to solve.

Work Together

Ms. Perez has 43.5 inches of lace for some dresses. Each dress needs 8.7 inches of lace. How many dresses can Ms. Perez make?

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On My Own

Name _____

Rewrite the equation using multiplication by powers of 10. Then, use partial quotients to solve.

1. $10.8 \div 1.2 =$ _____

2. $5.18 \div 0.74 =$ _____

3. $27.6 \div 4.6 =$ _____

4. $11.2 \div 1.6 =$ _____

5. How can you use a power of 10 to help you solve $83.2 \div 2.6$?

6. **STEM Connection** Saffron made a batch of dough to make dinner rolls. She has 0.76 kilogram of dough. If each roll uses 0.04 kilogram of dough, how many rolls can she make? Explain your reasoning.

7. Elliott has 49.5 yards of fabric to make T-shirts. Each T-shirt needs 4.5 yards of fabric. How many T-shirts can Elliott make?

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8. Jess has $13.85 in nickels. How many nickels does she have? How do you know?

9. Nina ran laps for a total of 209.2 seconds. She ran each lap in 52.3 seconds. How many laps did she run?

10. Sela bought 2.6 pounds of trail mix and spent $15.60. How much does one pound of trail mix cost?

    A. $5.00

    B. $5.50

    C. $6.00

    D. $6.25

11. **Extend Your Thinking** A coffee shop sells bags of coffee fo $9.90 per kilogram. Each bag holds 0.5 kilogram of coffe . How many bags of coffee do they sell if they earn $702.90? Explain your answer.

Reflect

How can powers of 10 help you divide a decimal by a decimal?

Math is... Mindset

What helped you want to do your best work?

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Unit 8

Decimal Division

Name _____

For each problem, use what you know about place value and division to select the correct quotient. Do not actually calculate the division.

1. What is the quotient for

$$21.76 \div 0.80?$$

Circle your answer.

a. 0.0272

b. 0.272

c. 2.72

d. 27.2

Explain or show your answer.

2. Which provides the answer to

$$3.0 \div 3.75?$$

Circle your answer.

a. 80

b. 8.0

c. 0.80

d. 0.08

Explain or show your answer.

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For each problem, use what you know about place value and division to select the correct quotient. Do not actually calculate the division.

3. Which provides the answer to

$$0.036 \div 0.24?$$

Circle your answer.

a. 0.15

b. 0.015

c. 1.50

d. 15.0

Explain or show your answer.

4. Which provides the answer to

$$80.4 \div 0.67?$$

Circle your answer.

a. 0.12

b. 1.2

c. 12

d. 120

Explain or show your answer.

Reflect On Your Learning

I'm confused. | I'm still learning. | I understand. | I can teach someone else.

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Unit Review

Name _____

Vocabulary Review

Choose the correct word(s) to complete each sentence.

dividend	estimate	quotient
divisor	power of 10	

1. To find an approximate value in a calculation is to _____. (Lesson 8-2)

2. In a division problem, the _____ is divided by the _____. (Lesson 8-2)

3. The _____ is the result of dividing one number by another. (Lesson 8-2)

4. Place value can be represented using a _____. (Lesson 8-1)

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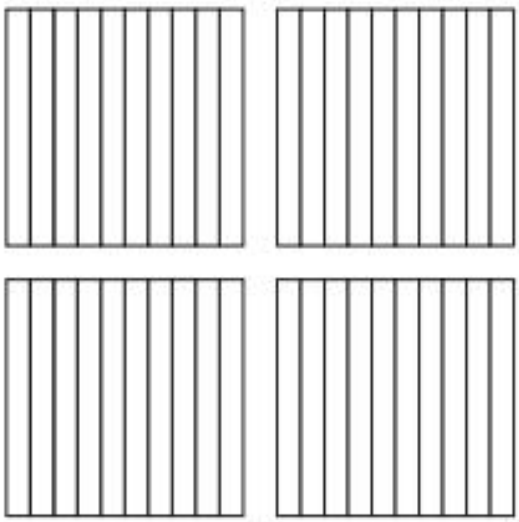
Review

5. Use the decimal grids to solve $2.4 \div 6 = d$. (Lesson 8-3)



$2.4 \div 6 =$ _____

6. Use a pattern to find the quotients. (Lesson 8-1)

$32.8 \div 100 =$ _____

$32.8 \div 10 =$ _____

$32.8 \div 1 =$ _____

$32.8 \div 0.1 =$ _____

$32.8 \div 0.01 =$ _____

7. Mr. Blare earns $12.40 an hour. Last week, he earned $471.20. How many hours did he work last week? (Lesson 8-6)

8. What is the quotient? (Lesson 8-5)

$82 \div 0.2 = b$

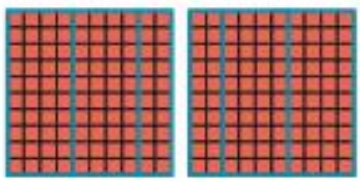
9. A quarter is about 0.2 centimeters thick. About how many quarters are needed so that a stack of quarters is 10.8 centimeters tall? (Lesson 8-2)

A. 10 **B.** 20

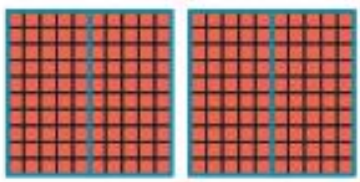
C. 50 **D.** 80

10. Which model shows $2 \div 0.4$? (Lesson 8-5)

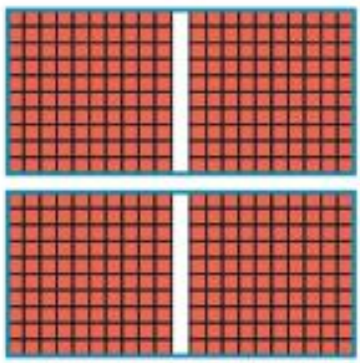
A.



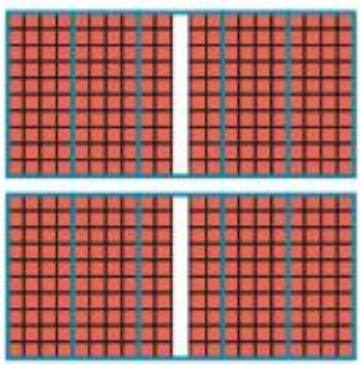
B.



C.



D.



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11. What is the quotient? (Lesson 8-4)

$$9.72 \div 3 = d$$

12. Which equivalent expression uses powers of 10 to help you solve $96 \div 1.2$? (Lesson 8-5)

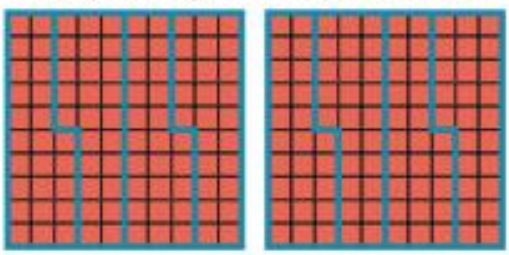
A. $96 \div 12$

B. $96 \div 120$

C. $960 \div 12$

D. $960 \div 120$

13. The model represents $2 \div 0.25$. What is the quotient? (Lesson 8-5)



14. Which equivalent expression uses powers of 10 to help you solve $52.71 \div 0.21$? (Lesson 8-6)

A. $5{,}271 \div 21$

B. $5{,}271 \div 0.21$

C. $52.71 \div 21$

D. $52.71 \div 2.1$

15. What is the quotient? (Lesson 8-4)

$$2.5 \div 5 = b$$

A. 0.05

B. 0.5

C. 5

D. 50

16. Danny cuts a 2.7-meter long wire into 3 equal pieces. How long is each piece of wire? (Lesson 8-4)

17. Which representation can you use to find the quotient o $0.36 \div 6$? (Lesson 8-4)

A. 3.6 tenths ÷ 6 = 6 tenths

B. 36 tenths ÷ 6 = 6 tenths

C. 3.6 hundredths ÷ 6 = 6 hundredths

D. 36 hundredths ÷ 6 = 6 hundredths

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Performance Task

Chef Malory is making salads.

Chef Malory's Special Salad

- 10 oz spinach
- $\frac{1}{8}$ small onion
- 6 sliced strawberries
- 0.7 oz walnuts
- 1.4 oz blue cheese
- 0.5 oz vinaigrette

Part A: Chef Malory is buying the blue cheese. He found two containers of blue cheese, one that is 4 oz and another one 7 oz. Which container will allow him to use the entire container and how many salads can he make?

Part B: Chef Malory has a 1.75 pound of walnuts. How many salads could he make? Will he use the whole bag?

Part C: If Chef Malory wanted to use his entire bag of walnuts, how much would he need of the other ingredients?

Reflect

How is dividing decimals the same as dividing whole numbers?

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Unit 8

Fluency Practice

Name _____

Fluency Strategy

You can use place value and properties of operations to multiply by multiples of 100.

$600 \times 4 = 6 \times 100 \times 4$	Write 600 as 6×100.
$= 6 \times 4 \times 100$	Use properties to change the order of the factors without changing the product.
$= 24 \times 100$	Multiply.
$= 2{,}400$	

1. Use place value and properties to multiply.

$900 \times 3 =$ _____ $\times 100 \times 3$

$= 9 \times$ _____ $\times 100$

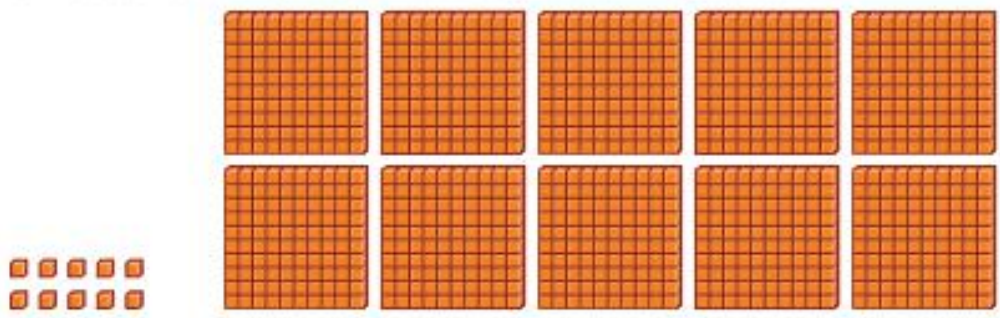
$=$ _____ $\times 100$

$=$ _____

Fluency Flash

Use the models to complete the multiplication equations.

2.



$2 \times 5 =$ _____ $\qquad 2 \times 500 =$ _____

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Fluency Check

What is the difference or product?

3. $4 \times 800 =$ _____
4. $6 \times 30 =$ _____
5. $600 \times 2 =$ _____
6. $4 \times 90 =$ _____
7. $553 - 151 =$ _____
8. $20 \times 8 =$ _____
9. $300 \times 7 =$ _____
10. $900 \times 8 =$ _____
11. $7 \times 600 =$ _____
12. $90 \times 5 =$ _____
13. $2{,}478 - 247 =$ _____
14. $200 \times 4 =$ _____
15. $8 \times 700 =$ _____
16. $961 - 432 =$ _____

Fluency Talk

Explain how you can use properties of operations to find the product of a number and a multiple of 100.

What patterns do you use when you multiply a number by a multiple of 10?

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Add and Subtract Fractions

Focus Question

How can I add and subtract fractions?

Hi, I'm Poppy.

I want to be a park ranger. Let's say it was very hot at the park for one-fourth of the day, and then it rained for two-thirds of the day. I can add to find out what fraction of the day had unpleasant weather. I need to add fractions with unlike denominators.

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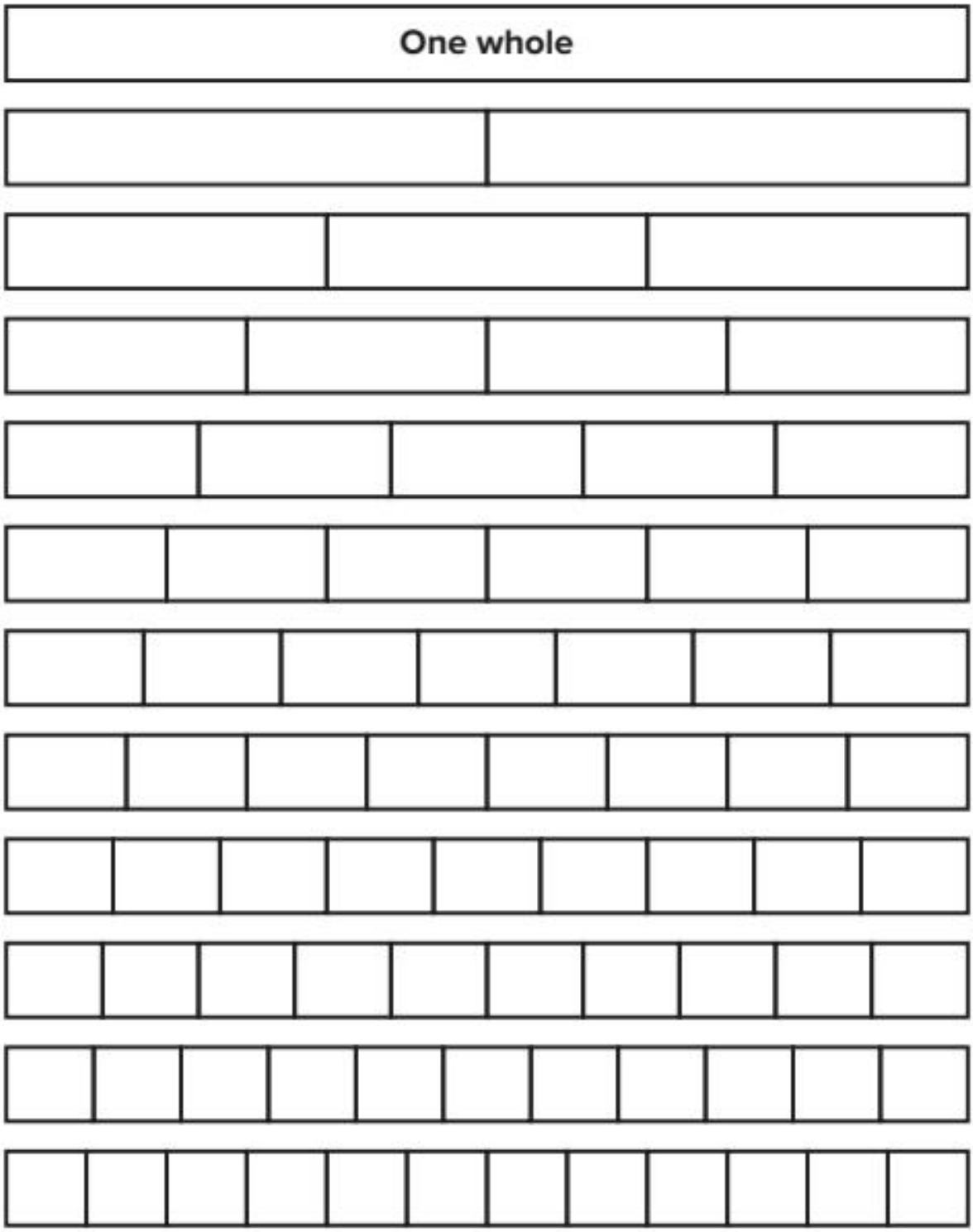
STEM video | GO ONLINE

IGNITE!

Name _____

Fraction Wall

Use the strips to make fractions.



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Lesson 9-1

Estimate Sums and Differences of Fractions

Be Curious

Which doesn't belong?

$\frac{8}{16}$ $\frac{3}{18}$

$\frac{5}{10}$ $\frac{6}{13}$

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Math is... Mindset

What are your strengths in math?

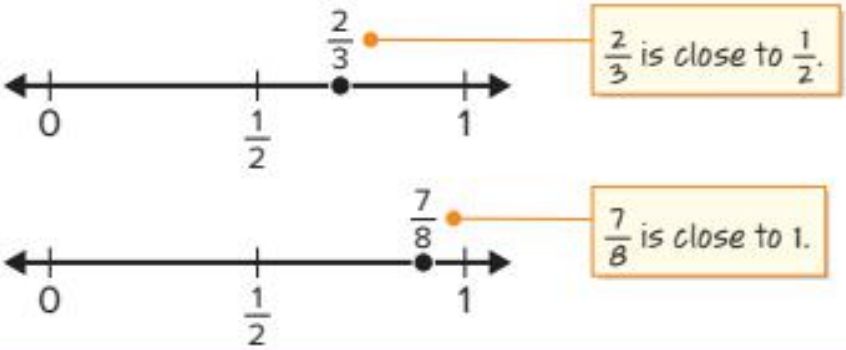
Learn

Ravi estimates that he needs $1\frac{1}{2}$ gallons of paint. He has two cans of paint with the amount of paint shown.

Does Ravi have enough paint?

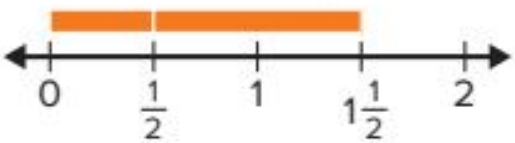
You can use a number line to help you estimate.

Use benchmark numbers to estimate each fraction.



Estimate the sum using benchmark numbers.

$\frac{2}{3}$ is close to $\frac{1}{2}$ and $\frac{7}{8}$ is close to 1.



$\frac{1}{2} + 1 = 1\frac{1}{2}$

Ravi should have enough paint. He has about $1\frac{1}{2}$ gallons of paint.

Math is... Connections

What benchmarks do you use when estimating whole number sums?

You can use **benchmark numbers** to estimate sums and differences of fractions. You can use estimation to check the reasonableness of a calculated solution.

Work Together

Use estimation to determine whether each solution is reasonable. Explain your reasoning.

$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$

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

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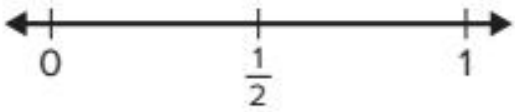
On My Own

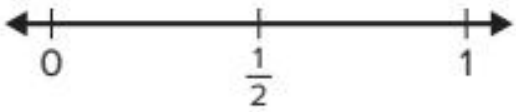
Name _____

Will the sum be *greater than 1* or *less than 1*? Use the number line and explain how you can use benchmark numbers to justify.

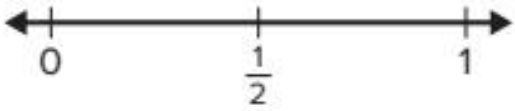
1. $\frac{3}{4} + \frac{2}{3}$



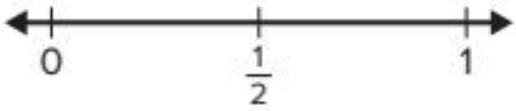
2. $\frac{3}{5} + \frac{1}{4}$



3. $\frac{1}{3} + \frac{5}{8}$



4. $\frac{3}{10} + \frac{4}{5}$



Is the sum or difference reasonable? Use estimation to check.

5. $\frac{1}{4} + \frac{5}{6} = \frac{3}{4}$

6. $\frac{2}{5} + \frac{1}{2} = \frac{9}{10}$

7. $\frac{3}{4} - \frac{3}{8} = \frac{2}{3}$

8. $\frac{7}{10} - \frac{2}{5} = \frac{1}{2}$

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9. Dan waters his plants with $\frac{2}{3}$ cup of water on Monday and $\frac{2}{3}$ cup of water on Friday. Does Dan use more than 1 cup of water in all? Explain why or why not.

10. There is $\frac{7}{8}$ gallon of milk in Zelda's refrigerator. Zelda and her brother drink $\frac{1}{3}$ gallon of milk. About how much milk is left? Explain your answer.

11. **STEM Connection** Poppy is helping clean up a park. Her group is cleaning up $\frac{2}{5}$ of the park. Another group is cleaning up $\frac{1}{4}$ of the park. About how much of the park should a third group clean up so that they cover the entire park?

12. **Extend Your Thinking** How can you apply estimating the sums and differences of fractions that are less than 1 to fractions that are greater than 1?

Reflect

Why is estimating the sums and differences of fractions useful?

Math is... Mindset

How did you use your strengths in math today?

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Unit 9

Make an Estimate of the Sum

Name _____

Without actually calculating, use what you know about fractions to estimate the sum.

1. $\frac{1}{7} + \frac{1}{9}$

Circle the best estimate.

a. $\frac{1}{8}$

b. $\frac{1}{4}$

c. $\frac{1}{2}$

d. 2

e. 16

Explain your choice.

2. $\frac{5}{6} + \frac{13}{14}$

Circle the best estimate.

a. $\frac{1}{2}$

b. 1

c. 2

d. 18

e. 20

Explain your choice.

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Without actually calculating, use what you know about fractions to estimate the sum.

3. $\frac{4}{7} + \frac{6}{11}$

Circle the best estimate.

a. $\frac{1}{2}$

b. 1

c. 2

d. 10

e. 18

Explain your choice.

4. $\frac{9}{20} + \frac{1}{4}$

Circle the best estimate.

a. $\frac{1}{2}$

b. $\frac{3}{4}$

c. 1

d. 10

e. 24

Explain your choice.

Reflect On Your Learning

I'm confused. | I'm still learning. | I understand. | I can teach someone else.

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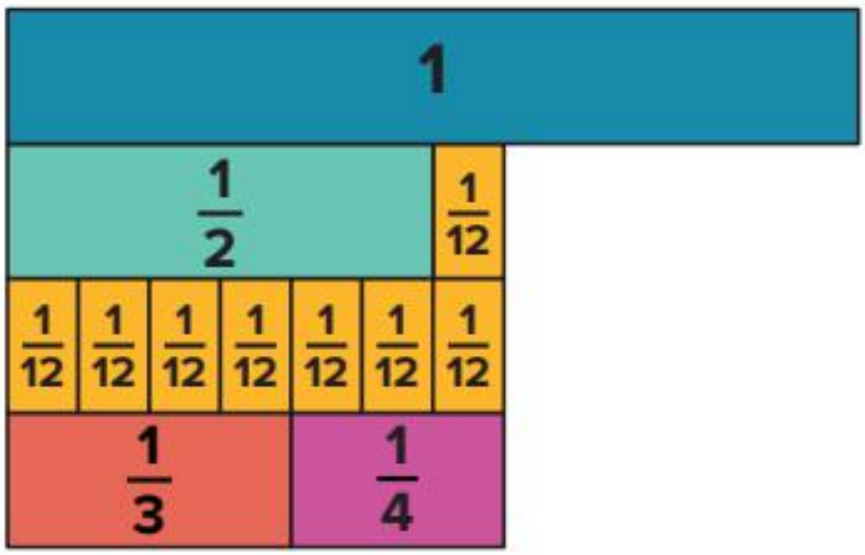
Lesson 9-2

Represent Addition of Fractions with Unlike Denominators

Be Curious

How are they the same?
How are they different?



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Math is... Mindset

How can you show others that you respect their ideas?

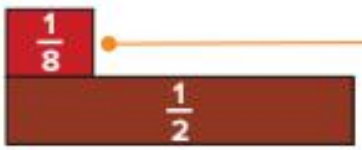
Learn

How far is Skye's house from Frida's house?

When adding, you always add like units.

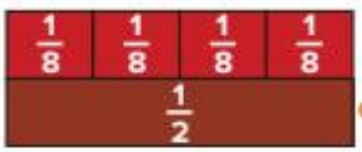
$\frac{1}{2} + \frac{1}{8} = ?$

$\frac{1}{2}$ and $\frac{1}{8}$ are not like units. They do not represent the same-sized part of the whole.



$\frac{1}{8}$ is a smaller part of the whole.

You can find a fraction that is equivalent to $\frac{1}{2}$ with a denominator of 8.



$\frac{4}{8}$ is equivalent to $\frac{1}{2}$.

Add the eighths.

$\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$.

Skye's house is $\frac{5}{8}$ mile from Frida's house.

Math is... Choosing Tools

What other tool could you use?

When adding fractions with unlike denominators, you generate equivalent fractions with like denominators before adding.

Work Together

What is the sum?

$\frac{1}{4} + \frac{2}{3} =$ ____

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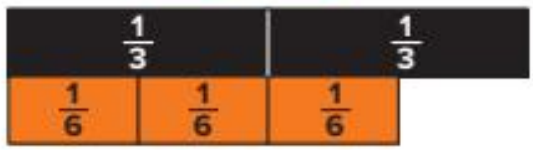
On My Own

Name _____

Complete the equation using addends with like denominators.

1. $\frac{1}{2} + \frac{3}{10} = \frac{\square}{\square} + \frac{\square}{\square}$

2. $\frac{2}{3} + \frac{5}{9} = \frac{\square}{\square} + \frac{\square}{\square}$



3. $\frac{5}{8} + \frac{1}{4} = \frac{\square}{\square} + \frac{\square}{\square}$

4. $\frac{3}{4} + \frac{1}{6} = \frac{\square}{\square} + \frac{\square}{\square}$

What is the sum? Use a representation to solve.

5. $\frac{4}{9} + \frac{1}{3} =$ _____

6. $\frac{3}{8} + \frac{3}{4} =$ _____

7. $\frac{2}{5} + \frac{7}{10} =$ _____

8. $\frac{7}{12} + \frac{5}{6} =$ _____

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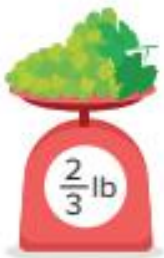
9. Emily drinks $\frac{2}{5}$ liter of water during the first quarter of her basketball game. She drinks $\frac{1}{2}$ liter during the second quarter. How many liters of water does Emily drink during the first two quarters?

10. Matias has $\frac{1}{8}$ cup of almonds for a bag of trail mix. He adds $\frac{3}{4}$ cup of cashews. Is there more or less than 1 cup of nuts in the trail mix? Explain your thinking.

11. Zack has this bunch of grapes. He buys another $\frac{1}{6}$ pound of grapes. How many pounds of grapes does Zack have now?



12. What is a reasonable estimate of the sum? Use estimation to justify your answer.

$$\frac{1}{2} + \frac{2}{3} = b$$

13. **Extend Your Thinking** Marnie and Amber walk together for $\frac{1}{4}$ mile. Marnie then walks $\frac{3}{8}$ mile to her house, and Amber walks $\frac{1}{3}$ mile to her house. How far did Marnie walk? How far did Amber walk?

Reflect

How can you represent addition of fractions with unlike denominators?

Math is... Mindset

How did you show others that you respect their ideas?

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Lesson 9-3

Add Fractions with Unlike Denominators

Be Curious

Which doesn't belong?

9

12

27

45

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Math is... Mindset

How do you make sure you share your thinking clearly?

Learn

Paloma's mother made two pans of snacks. She will put what is left into one pan.

What fraction of one pan is left?

For some equations, you will find equivalent fractions for both addends.

Step 1: Find a common multiple of both denominators.

$\frac{1}{6} + \frac{4}{9} = t$

Multiples of 6: 6, 12, 18, 24
Multiples of 9: 9, 18, 27, 36

Step 2: Write an equivalent fraction with a denominator of 18 for each fraction.

$\frac{1 \times 3}{6 \times 3} = \frac{3}{18}$ $\frac{4 \times 2}{9 \times 2} = \frac{8}{18}$

Step 3: Add the fractions.

$\frac{3}{18} + \frac{8}{18} = \frac{11}{18}$

There is $\frac{11}{18}$ of the pan left.

Math is... Connections

What other common multiple could you use?

To add fractions with unlike denominators, rewrite each addend as an equivalent fraction so that they have like denominators.

Work Together

What is the sum? Explain how you found like denominators.

$\frac{1}{5} + \frac{2}{3} =$ ____

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On My Own

Name _____

Which multiple can you use as a like denominator to add the fractions? Choose all correct answers.

1. $\frac{2}{3} + \frac{3}{4}$

A. 6

B. 8

C. 12

D. 24

2. $\frac{1}{6} + \frac{3}{8}$

A. 12

B. 16

C. 24

D. 30

Complete the equation using addends with like denominators.

3. $\frac{3}{5} + \frac{1}{4} = \frac{\square}{\square} + \frac{\square}{\square}$

4. $\frac{2}{3} + \frac{1}{6} = \frac{\square}{\square} + \frac{\square}{\square}$

What is the sum?

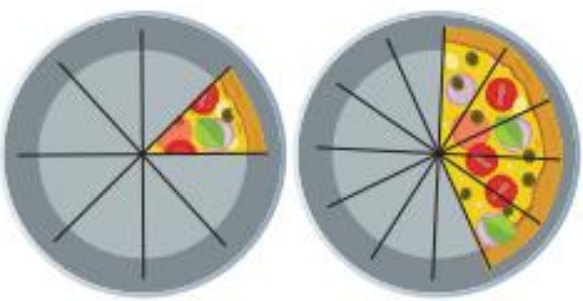
5. $\frac{2}{9} + \frac{5}{12} =$ _____

6. $\frac{3}{8} + \frac{1}{3} =$ _____

7. $\frac{5}{8} + \frac{3}{10} =$ _____

8. $\frac{2}{7} + \frac{1}{2} =$ _____

9. A club ordered two same-sized vegetable pizzas cut into different numbers of pieces. What fraction of a whole pizza is left?



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10. Oliver uses $\frac{1}{6}$ gallon of water for his outdoor plants. He uses $\frac{1}{4}$ gallon of water for his indoor plants. How many gallons of water does Oliver use on all of his plants?

11. Heather uses $\frac{2}{3}$ foot of yarn for her art project. She adds another $\frac{1}{12}$ foot to complete the project. How much yarn does Heather use in all?

12. **Error Analysis** Mia found the sum of $\frac{2}{9} + \frac{3}{4}$.
How can you help Mia correct her mistake?

$$\frac{2 \times 2}{2 \times 9} + \frac{3 \times 4}{4 \times 4} = \frac{4}{18} + \frac{12}{18} = \frac{16}{18}$$

13. **Extend Your Thinking** Solve the equation using two different like denominators. Is the sum the same when you use different denominators? Explain why or why not.
$\frac{3}{8} + \frac{7}{10} = ?$

Reflect

How can equivalent fractions help you add fractions with unlike denominators?

Math is... Mindset
How did you make sure you shared your thinking clearly?

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Lesson 9-4

Represent Subtraction of Fractions with Unlike Denominators

Be Curious

Is it always true?

Any fraction with a denominator of 3 can be written as a fraction with a denominator of 6.

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Math is... Mindset

What helps you stay focused in class?

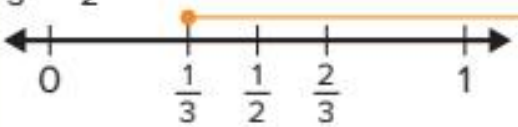
Learn

Binta needs two boards of equal length.

How much of the longer board will she cut off?

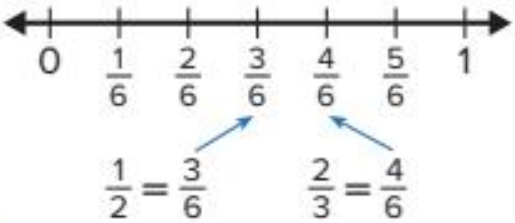
A representation can help you solve the equation.

$\frac{2}{3} - \frac{1}{2} = b$ Thirds and halves are not like units.



$\frac{1}{3}$ is a smaller interval than $\frac{1}{2}$.

You can find equivalent fractions with a denominator of 6.



Math is... Generalizations

How is subtracting fractions with unlike denominators similar to adding fractions with unlike denominators?

Subtract the sixths.

$\frac{4}{6} - \frac{3}{6} = \frac{1}{6}$

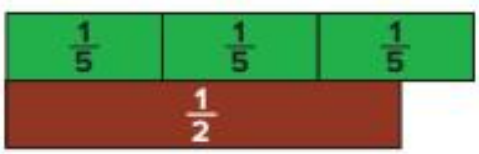
Binta will cut $\frac{1}{6}$ yard off the longer board.

When subtracting fractions with unlike denominators, you can use equivalent fractions to write fractions with like denominators.

Work Together

What is the difference?

$\frac{3}{5} - \frac{1}{2} =$ _____



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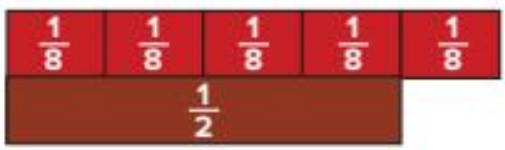
On My Own

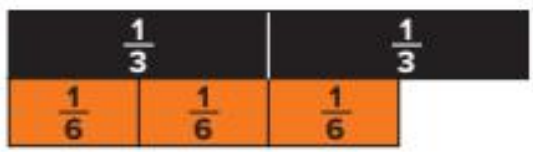
Name _____

Complete the equation with equivalent fractions that have like denominators.

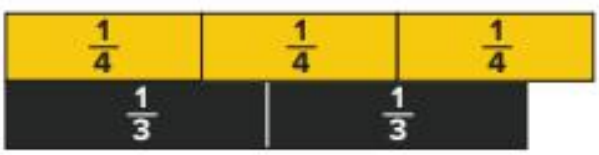
1. $\frac{5}{8} - \frac{1}{2} = \frac{\square}{\square} - \frac{\square}{\square}$



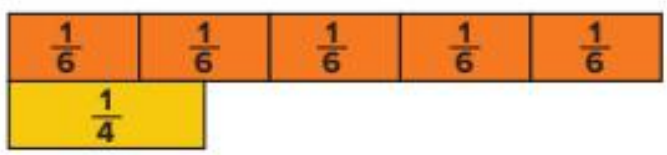
2. $\frac{2}{3} - \frac{3}{6} = \frac{\square}{\square} - \frac{\square}{\square}$



3. $\frac{3}{4} - \frac{2}{3} = \frac{\square}{\square} - \frac{\square}{\square}$



4. $\frac{5}{6} - \frac{1}{4} = \frac{\square}{\square} - \frac{\square}{\square}$



What is the difference? Use a representation to solve.

5. $\frac{4}{5} - \frac{1}{2} =$ _____

6. $\frac{7}{8} - \frac{1}{4} =$ _____

7. $\frac{11}{12} - \frac{1}{6} =$ _____

8. $\frac{5}{6} - \frac{2}{3} =$ _____

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9. **STEM Connection** Saffron has a recipe that calls fo using $\frac{3}{4}$ cup of flou . She has only $\frac{1}{3}$ cup of flou . How much more flour does Saffron need to m e the recipe?

10. Zoe bought $\frac{9}{10}$ pound of cherries. She ate $\frac{1}{5}$ pound in one day. How many pounds of cherries does Zoe have left?

11. Victoria walked her dog $\frac{5}{6}$ mile. Miguel walked his dog $\frac{3}{4}$ mile. Who walked farther? By how much more did that person walk?

12. **Extend Your Thinking** What is the differenc ? Use estimation to justify your thinking.

$$\frac{11}{12} - \frac{1}{3} - \frac{1}{6} = ?$$

Reflect

How can representations help you subtract fractions with unlike denominators?

Math is... Mindset

What helped you stay focused in class today?

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Lesson 9-5

Subtract Fractions with Unlike Denominators

Be Curious

What do you notice?
What do you wonder?

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Math is... Mindset

How do different ideas and viewpoints help you learn better?

Learn

Joana started with $\frac{3}{4}$ quart of orange juice. The amount shown is how much she has left.

How can you determine how much orange juice Joana used?

When subtracting fractions, the fractions must represent the same-size parts of a whole.

Step 1: Find a common multiple of both denominators.

$\frac{3}{4} - \frac{1}{3} = j$

Multiples of 4: 4, 8, 12, 16, ...

Multiples of 3: 3, 6, 9, 12, 15,...

Step 2: Write an equivalent fraction with a denominator of 12 for each fraction.

$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ $\frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

Step 3: Subtract the fractions.

$\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$

Luis used $\frac{5}{12}$ quart of orange juice.

Math is... Quantities

Is it possible to use a denominator other than 12 and get the same answer? Explain.

To subtract fractions with unlike denominators, first write each fraction as an equivalent fraction so that they have like denominators.

Work Together

Jodie is walking the Riverside Trail. She has walked $\frac{1}{2}$ mile. How much farther does she have to walk? Explain your solution.

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On My Own

Name _____

Which multiple can you use as a like denominator to subtract the fractions?

1. $\frac{7}{8} - \frac{1}{3}$

A. 12

B. 16

C. 24

D. 30

2. $\frac{4}{5} - \frac{1}{4} = ?$

A. 10

B. 20

C. 24

D. 35

Complete the equation using fractions with like denominators.

3. $\frac{7}{9} - \frac{1}{6} = \frac{\square}{\square} - \frac{\square}{\square}$

4. $\frac{9}{10} - \frac{3}{4} = \frac{\square}{\square} - \frac{\square}{\square}$

What is the difference?

5. $\frac{7}{12} - \frac{3}{8} =$ _____

6. $\frac{6}{7} - \frac{1}{2} =$ _____

7. $\frac{5}{6} - \frac{1}{4} =$ _____

8. $\frac{3}{5} - \frac{1}{3} =$ _____

9. Miranda painted a room with a can of paint that had $\frac{7}{8}$ gallon in it. The amount shown is how much paint is left in the can. How much paint did Miranda use to paint the room?

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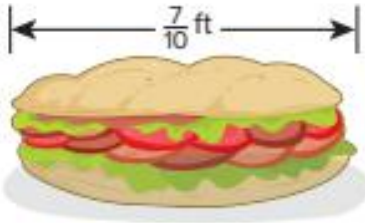
10. Eddie had $\frac{3}{4}$ quart of water for his soccer game. By half time, he drank $\frac{2}{5}$ quart of water. How much water does Eddie have left?

11. Isabel bought this sandwich. She ate $\frac{5}{8}$ foot of the sandwich. How much of the sandwich is left?



12. Alan is walking on a path that is $\frac{11}{12}$ mile long. He has walked $\frac{7}{9}$ mile. How much farther does he have to walk?

13. **Extend Your Thinking** Solve the equation using two different like denominators. Is the difference the same when you use different denominator ? Explain why or why not.

$\frac{9}{10} - \frac{1}{6} = ?$

Reflect

How can equivalent fractions help you subtract fractions with unlike denominators?

Math is... Mindset

How did different ideas and viewpoints help you learn better?

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Lesson 9-6

Add Mixed Numbers with Unlike Denominators

Be Curious

What questions can you ask?

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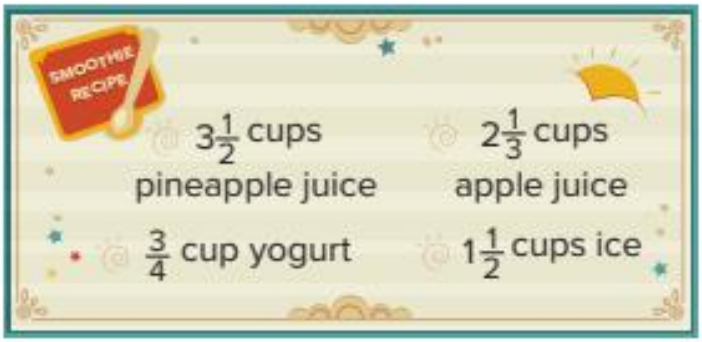
Math is... Mindset

What helps you know when there is a problem?

Learn

Lorenzo is making smoothies.

How many cups of juice does he need in all?



You can use the equation $3\frac{1}{2} + 2\frac{1}{3} = j$ to represent the problem.

Write equivalent fractions with like denominators.

$$\begin{array}{r} 3\frac{1}{2} = 3\frac{3}{6} \\ +\ 2\frac{1}{3} = 2\frac{2}{6} \end{array}$$

Math is... Patterns

How is adding mixed numbers similar to adding multi-digit numbers?

Add fractions and whole numbers.

$$\begin{array}{r} 3\frac{3}{6} \\ +\ 2\frac{2}{6} \\ \hline 5\frac{5}{6} \end{array}$$

Lorenzo needs $5\frac{5}{6}$ cups of juice.

When adding mixed numbers, you add the fractions and the whole numbers.

Work Together

Lorenzo found the amount of juice using a different strategy. How do you respond to Lorenzo's work?

$$\frac{7}{2} + \frac{7}{3} = \frac{21}{6} + \frac{14}{6} = \frac{35}{6}$$

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On My Own

Name _____

What is the sum? Choose the correct answer.

1. $3\frac{3}{10} + 4\frac{2}{5} = ?$

A. $7\frac{5}{10}$

B. $8\frac{7}{10}$

C. $8\frac{5}{10}$

D. $7\frac{7}{10}$

2. $1\frac{3}{4} + 5\frac{1}{6} = ?$

A. $6\frac{4}{6}$

B. $7\frac{4}{12}$

C. $6\frac{11}{12}$

D. $6\frac{5}{6}$

What is the sum?

3. $2\frac{2}{3} + 3\frac{1}{4} =$ _____

4. $4\frac{1}{2} + 5\frac{1}{3} =$ _____

5. $6\frac{3}{8} + 2\frac{1}{6} =$ _____

6. $3\frac{2}{9} + 1\frac{3}{4} =$ _____

7. $2\frac{1}{5} + 3\frac{1}{2} =$ _____

8. $5\frac{1}{3} + 4\frac{2}{5} =$ _____

9. Jill bought the strawberries and blueberries shown at a farmer's market. How many pounds of fruit did Jill buy?

$2\frac{3}{4}$ lb $1\frac{1}{8}$ lb

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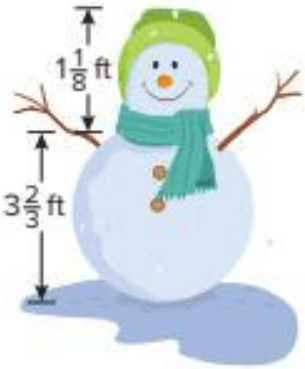
10. Timothy rides his bike $1\frac{1}{2}$ miles to school. After school, he rides $2\frac{2}{5}$ miles to his piano lesson, then 2 miles back home. How many miles does Timothy ride in all?

11. Marcus builds the body of this snowman. He then builds the head. How tall is Marcus's snowman?



12. Solve the equation.

$4\frac{7}{10} + 2\frac{3}{4} = ?$

What do you notice about the sum of the two fractions? How can you rewrite the sum?

13. **Extend Your Thinking** The chef at the restaurant uses $6\frac{2}{3}$ pounds of mushrooms on Saturday. On Sunday, she uses $1\frac{3}{8}$ more pounds of mushrooms than she did on Saturday. How many pounds of mushrooms did the chef use in all over the weekend?

Reflect

How can you add mixed numbers with unlike denominators?

Math is... Mindset

What helped you know when there was a problem?

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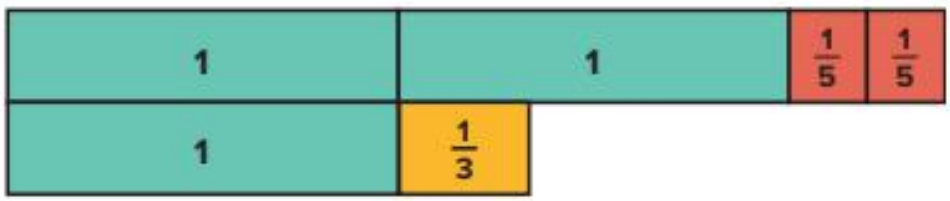
Lesson 9-7

Subtract Mixed Numbers with Unlike Denominators

Be Curious

What could the question be?



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Math is... Mindset

What helps you work well in a team?

Learn

How much longer is Jorge's leash than Magda's leash?

You can use the equation $2\frac{2}{3} - 1\frac{1}{4} = d$ to represent the problem.

One Way Rewrite the fractions as equivalent fractions with like denominators. Then, subtract.

$$\begin{aligned} 2\frac{2}{3} &= 2\frac{8}{12} \\ -\ 1\frac{1}{4} &= 1\frac{3}{12} \end{aligned} \qquad \begin{array}{r} 2\frac{8}{12} \\ -\ 1\frac{3}{12} \\ \hline 1\frac{5}{12} \end{array}$$

Subtract the fractions, then the whole numbers.

Jorge's leash is $1\frac{5}{12}$ yards longer than Magda's leash.

Another Way Rewrite the mixed numbers as equivalent fractions with like denominators.

$$2\frac{2}{3} = \frac{8}{3} = \frac{32}{12}$$
$$-\ 1\frac{1}{4} = \frac{5}{4} = \frac{15}{12}$$
$$\frac{32}{12} - \frac{15}{12} = \frac{17}{12}$$

Jorge's leash is $\frac{17}{12}$ yards longer than Magda's leash.

Math is... Structure

How can you show that the differences found are the same?

You can use different strategies to subtract mixed numbers with unlike denominators.

Work Together

Marcella walks $2\frac{2}{3}$ miles from her house to the bookstore.

Jacques walks $3\frac{5}{6}$ miles from his house to the bookstore.

How much farther does Jacques walk?

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On My Own

Name _____

What is the difference? Choose the correct answer.

1. $3\frac{2}{3} - 1\frac{1}{5} = ?$

A. $2\frac{7}{15}$

B. $2\frac{1}{5}$

C. $2\frac{1}{15}$

D. $2\frac{1}{3}$

2. $6\frac{7}{8} - 5\frac{5}{6} = ?$

A. $1\frac{5}{24}$

B. $1\frac{1}{24}$

C. $1\frac{4}{24}$

D. $1\frac{2}{24}$

What is the difference?

3. $4\frac{3}{4} - 1\frac{1}{3} =$ _____

4. $2\frac{3}{5} - 1\frac{1}{2} =$ _____

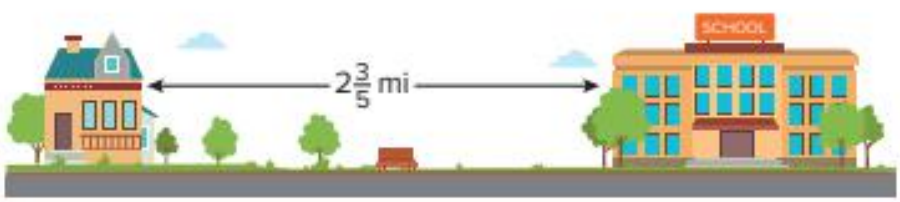
5. $5\frac{5}{9} - 3\frac{1}{6} =$ _____

6. $3\frac{7}{10} - 1\frac{3}{8} =$ _____

7. $6\frac{1}{2} - 3\frac{1}{3} =$ _____

8. $4\frac{5}{8} - 3\frac{1}{5} =$ _____

9. The distance from Martin's house to school is shown. After 20 minutes, Martin walked $1\frac{1}{3}$ miles. What distance does he have left to walk?



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10. Mrs. Williams bought $5\frac{1}{2}$ gallons of apple juice for the classroom party. She used $3\frac{1}{3}$ gallons during the party. How many gallons of apple juice does Mrs. Williams have left?

11. **Error Analysis** Brian solved this subtraction problem:

$4\frac{5}{6} - 2\frac{1}{4} = \frac{29}{6} - \frac{9}{4} = \frac{20}{6}$

Is Brian correct? Explain why or why not.

12. The combined weight of two wood planks is $6\frac{3}{4}$ pounds. The weight of one wood plank is shown. How many pounds is the second wood plank?

13. **Extend Your Thinking** Write and solve a real-world problem involving subtraction of two mixed numbers whose difference is less than $2\frac{1}{2}$.

Reflect

How can you subtract mixed numbers with unlike denominators?

Math is... Mindset

What helped you work well in a team?

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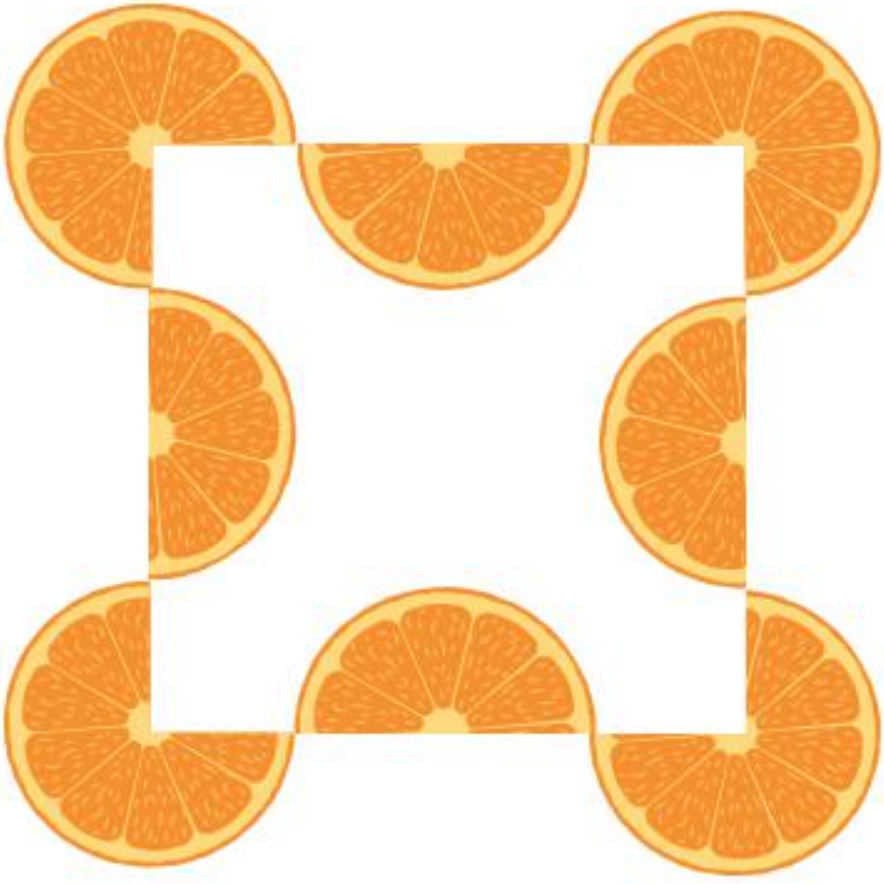
Lesson 9-8

Add and Subtract Mixed Numbers with Regrouping

Be Curious

What do you notice?
What do you wonder?



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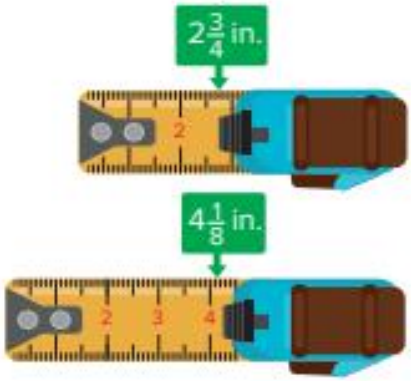
Math is... Mindset

Why is it useful to consider different possible solutions to a problem?

Learn

How can you determine the difference of the lengths shown?

You can use the equation $4\frac{1}{8} - 2\frac{3}{4} = d$ to represent the problem.



Rewrite the fractions as equivalent fractions with like denominators.

$$\begin{array}{r} 4\frac{1}{8} = 4\frac{1}{8} \\ -\ 2\frac{3}{4} = 2\frac{6}{8} \\ \hline \end{array}$$

$\frac{1}{8} < \frac{6}{8}$

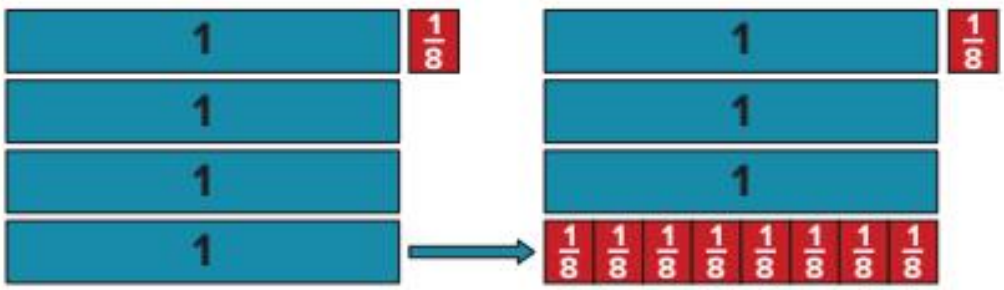
There are not enough eighths to subtract.

Math is... Structure

How is this regrouping similar to subtracting whole numbers?

Decompose 1 whole into $\frac{8}{8}$.

$4\frac{1}{8} = 3\frac{9}{8}$



$$\begin{array}{r} 3\frac{9}{8} \\ -\ 2\frac{6}{8} \\ \hline 1\frac{3}{8} \end{array}$$

The difference is $1\frac{3}{8}$ inches.

When subtracting mixed numbers, it is sometimes necessary to rename a whole as an equivalent fraction.

Work Together

Gia and Oren are having a lemonade sale. They sell $4\frac{2}{3}$ quarts the first hour and $3\frac{1}{2}$ quarts the second hour. How many quarts did they sell in two hours?

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On My Own

Name _____

What is the sum or difference? Choose the correct answer.

1. $5\frac{2}{5} - 3\frac{2}{3} = ?$

A. $2\frac{11}{15}$

B. $1\frac{1}{5}$

C. $2\frac{3}{5}$

D. $1\frac{11}{15}$

2. $4\frac{5}{6} + 3\frac{3}{4} = ?$

A. $7\frac{8}{12}$

B. $7\frac{7}{12}$

C. $8\frac{7}{12}$

D. $8\frac{8}{12}$

What is the sum or difference?

3. $6\frac{1}{8} - 4\frac{1}{3} =$ _____

4. $3\frac{3}{4} + 5\frac{2}{3} =$ _____

5. $8\frac{1}{6} - 2\frac{2}{9} =$ _____

6. $2\frac{7}{8} + 1\frac{1}{2} =$ _____

7. $3\frac{1}{5} - 2\frac{3}{4} =$ _____

8. $1\frac{7}{12} + 3\frac{5}{8} =$ _____

9. A chef bought this bag of almonds. In two days, he used $3\frac{7}{10}$ pounds of almonds. How many pounds of almonds does he have left?

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10. **Error Analysis** Pearl solved this equation. Is Pearl's solution correct? Explain why or why not.

$7\frac{5}{8} - 4\frac{2}{3} = ?$

$7\frac{5}{8} - 4 = 3\frac{5}{8}$

$3\frac{5}{8} - \frac{2}{3} = 3\frac{15}{24} - \frac{16}{24} = 3\frac{1}{24}$

11. Andrea walks from her house to the store. She then walks from the store to the park. How many miles has Andrea walked?

12. **Extend Your Thinking** Trai picks $4\frac{2}{3}$ pounds of peaches and Sani picks $2\frac{1}{12}$ pounds of peaches. They want to pick $20\frac{3}{4}$ pounds of peaches altogether. If they both pick the same amount, how many more pounds of peaches should they pick to reach their goal?

Reflect

When is regrouping necessary when adding and subtracting mixed numbers?

Math is... Mindset

Why was it useful to consider different possible solutions to a problem?

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Lesson 9-9

Solve Problems Involving Fractions and Mixed Numbers

Be Curious

What questions could you ask?

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Math is... Mindset

How can you use your abilities and skills to be successful today?

Learn

Myra runs each day and records the distances. On Thursday, she ran $1\frac{5}{6}$ more miles than on Monday. On Friday, she ran $1\frac{1}{2}$ miles less than on Tuesday.

Day	Miles
Monday	$2\frac{2}{3}$
Tuesday	$4\frac{3}{5}$
Wednesday	$5\frac{6}{8}$
Thursday	
Friday	

How many miles did Myra run on Thursday and Friday?

You can write equations to solve the problem.

One Way Decompose to add.

$$\begin{array}{r} 2\frac{2}{3} = 2\frac{4}{6} \\ +\ 1\frac{5}{6} = 1\frac{5}{6} \\ \hline 3\frac{9}{6} \end{array}$$

Rewrite as equivalent fractions with like denominators.

Think of another way to write the mixed numbers.

Myra ran $3\frac{9}{6}$ or $4\frac{3}{6}$ miles on Thursday.

Math is... Choosing Tools

Are your calculated answers reasonable? How do you know?

Another Way Use equivalent fractions.

$$\begin{array}{r} 4\frac{3}{5} = 4\frac{6}{10} = \frac{46}{10} \\ -\ 1\frac{1}{2} = 1\frac{5}{10} = \frac{15}{10} \\ \hline \frac{31}{10} \end{array}$$

Think of another way to write the fraction.

Myra ran $\frac{31}{10}$ or $3\frac{1}{10}$ miles on Friday.

You can solve problems involving adding and subtracting mixed numbers using strategies you know.

Work Together

Yin was at the park for 5 hours. She spent $2\frac{1}{4}$ hours playing soccer. How long did she spend at the park not playing soccer? Justify your response.

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On My Own

Name _____

1. Jonah walks $2\frac{7}{8}$ miles on Monday. On Tuesday, he walks $1\frac{2}{3}$ miles. How many miles does Jonah walk on Monday and Tuesday?
   - **A.** $3\frac{9}{24}$ mi
   - **B.** $3\frac{13}{24}$ mi
   - **C.** $4\frac{13}{24}$ mi
   - **D.** $4\frac{15}{24}$ mi

2. Kai has $4\frac{2}{5}$ ounces of juice in his cup. Martha pours $5\frac{7}{10}$ more ounces into his cup. How many ounces of juice are in Kai's cup?
   - **A.** $9\frac{1}{10}$ oz
   - **B.** $9\frac{9}{10}$ oz
   - **C.** $10\frac{1}{10}$ oz
   - **D.** $10\frac{9}{10}$ oz

3. Aiyana buys $4\frac{3}{10}$ pounds of potatoes. She uses $2\frac{3}{4}$ pounds in a recipe. How many pounds does she have left?

4. Mark has a sheet of wrapping paper that is $1\frac{1}{3}$ yards long. He uses $\frac{3}{5}$ yard of the wrapping paper. How much of the sheet does Mark have left?

5. Ben and Gina go apple picking. The weights of the apples they pick are shown. How many pounds do they pick altogether?

6. Caleb walks $2\frac{1}{4}$ miles from his home to the park. Andre walks $1\frac{2}{3}$ miles from his home to the park. Who lives closer to the park? By how much?

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7. At the beginning of summer, Rick was $54\frac{5}{6}$ inches tall. He grew $1\frac{1}{4}$ inches over the summer. How tall is he now?

8. Andy walks his dog for $2\frac{2}{3}$ miles on Saturday. On Sunday, he walks his dog for $3\frac{1}{2}$ miles. How many miles does he walk his dog on Saturday and Sunday?

9. **STEM Connection** Poppy is helping to clean up a park. The trash bag she is using can hold up to 15 pounds. There are $10\frac{5}{8}$ pounds in the bag now. How many more pounds of trash can Poppy collect with the same bag?

10. **Extend Your Thinking** Write a word problem that involves addition or subtraction of fractions and mixed numbers to solve. The solution to the problem should equal a whole number.

Reflect

How does knowing how to add and subtract mixed numbers and fractions help you solve problems?

Math is... Mindset

How did you use your abilities and skills to be successful today?

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Unit Review Name _____

Vocabulary Review

Choose the correct word(s) to complete the sentence.

benchmark number	equivalent fractions	like denominators
denominator	estimate	mixed number

1. You can decompose _____ addends into whole numbers and fractions in order to find the sum. (Lesson 9-6)

2. To find the sum of fractions with unli e denominators, you can rewrite the fractions as _____ with like denominators. (Lesson 9-2)

3. You _____ the value of a sum or difference to check the reasonableness of the actual calculation. (Lesson 9-1)

4. Use the _____ 0, $\frac{1}{2}$, or 1 to estimate the sum or difference of fractions. (Lesson 9-1)

5. Use _____ to represent same-sized parts of the whole. (Lesson 9-2)

6. The number located at the bottom of a fraction is called a(n) _____ and represents the total number of equal parts. (Lesson 9-2)

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Review

7. What is the differenc ?

$\frac{2}{3} - \frac{1}{7} =$ _____ (Lesson 9-5)

8. What is the differenc ?

$\frac{4}{9} - \frac{1}{6} =$ _____ (Lesson 9-5)

9. What is the differenc ?

$\frac{6}{11} - \frac{1}{4} =$ _____ (Lesson 9-5)

10. Is the value of the expression greater than or less than 1? Use estimation. (Lesson 9-1)

$\frac{3}{10} + \frac{1}{5}$

11. A company makes 2 sizes of trail mix: $5\frac{4}{8}$-pound bags and $2\frac{3}{4}$-pound bags. What is the difference in pounds between the sizes of the 2 bags of trail mix? (Lesson 9-9)

12. Brianna is sending a care package to her brother at college. She has $\frac{4}{7}$ box filled with snacks and $\frac{5}{8}$ box filled with school supplies. Can she combine them and send them in 1 box? Explain your answer. (Lesson 9-1)

13. A restaurant serves a pasta salad that is $\frac{2}{5}$ pound pasta and $\frac{1}{3}$ pound of vegetables. What is the total weight of a serving of this pasta salad at the restaurant? (Lesson 9-9)

14. What is the sum?

$\frac{3}{7} + \frac{1}{3} =$ _____ (Lesson 9-3)

15. What is the sum?

$\frac{2}{5} + \frac{3}{8} =$ _____ (Lesson 9-3)

16. What is the sum?

$\frac{1}{4} + \frac{3}{5} =$ _____ (Lesson 9-3)

17. Zara mixed $\frac{2}{7}$ pound grapes and $\frac{5}{6}$ pound strawberries for a snack. How much more strawberries in pounds did Zara use than grapes? (Lesson 9-9)

18. Marcus is training for a marathon. All marathons are $26\frac{1}{5}$ miles. Yesterday he ran $\frac{3}{8}$ of a marathon and today he ran $\frac{4}{7}$ of a marathon. What fraction of a marathon did he run altogether? (Lesson 9-9)

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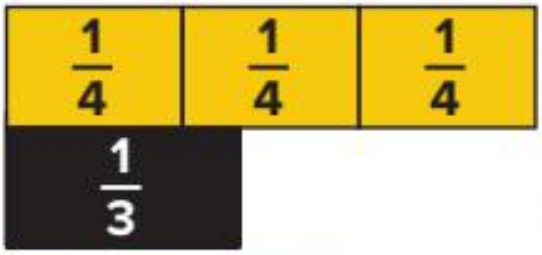
19. What equation do the fraction tiles represent? (Lesson 9-4)

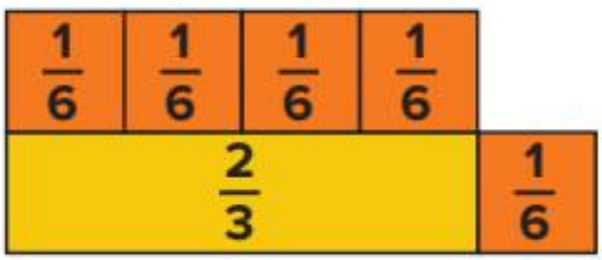


$\frac{\square}{\square} - \frac{\square}{\square} = \frac{\square}{\square}$

20. Use a representation to solve the equation. (Lesson 9-4)

$\frac{7}{8} - \frac{2}{3} =$ _____

21. What equation do the fraction tiles represent? (Lesson 9-2)



$\frac{\square}{\square} + \frac{\square}{\square} = \frac{\square}{\square}$

22. Fatima purchased $\frac{7}{9}$ yard of fabric. She uses $\frac{2}{5}$ yard of the fabric for a pillow. How much of the fabric does she have left? (Lesson 9-9)

23. Use a representation to solve the equation. (Lesson 9-2)

$\frac{3}{5} + \frac{1}{10} =$ _____

24. Use estimation to determine whether the solution is reasonable. (Lesson 9-1)

$\frac{3}{4} - \frac{2}{3} = \frac{7}{12}$

25. What is the sum?

$3\frac{2}{5} + 2\frac{1}{3} =$ _____ (Lesson 9-6)

26. What is the differenc ?

$4\frac{5}{9} - 2\frac{1}{6} =$ _____ (Lesson 9-7)

27. What is the sum?

$4\frac{2}{3} + 3\frac{3}{4} =$ _____ (Lesson 9-6)

28. What is the differenc ?

$6\frac{1}{4} - 2\frac{5}{6} =$ _____ (Lesson 9-7)

29. Todd biked $3\frac{3}{5}$ miles on Saturday and $4\frac{1}{7}$ miles on Sunday. How many miles did he bike altogether? (Lesson 9-9)

30. Mellissa made $8\frac{2}{3}$ quarts of punch. She needs $10\frac{1}{2}$ quarts of punch for a party. How much more punch does she need? (Lesson 9-8)

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Performance Task

Park rangers maintain trails by planting trees to stop erosion. Maya is planting saplings, or young trees, that are native to the park in order to stop erosion of the trail. She also will plant a row of shrubs.

Part A: As Maya, moved her cart she guessed that the three saplings had a total weight between 10 and 11 pounds. What is the weight of each of the saplings?

Part B: The row of shrubs will be 20 feet long. Maya planted three sets of shrubs. One shrub needs to be $7\frac{1}{2}$ feet from the other shrubs. How can you use fractions to show how far each shrub is from each other?

Reflect

Describe a real-world situation in which you might need to add or subtract mixed numbers.

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Unit 9

Fluency Practice

Name _____

Fluency Strategy

You can use place value and properties of operations to divide multiples of 10.

$56 \div 8 = 7$

56 tens $\div 8 =$ 7 tens

$560 \div 8 = 70$

1. Use place value to divide.

720 ÷ 9 = _____ tens ÷ 9

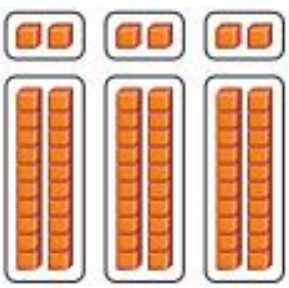
= _____ tens

= _____

Fluency Flash

Complete the division facts.

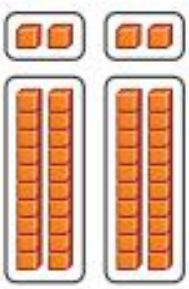
2.



6 ÷ 3 = ____

60 ÷ 3 = ____

3.



4 ÷ 2 = ____

40 ÷ 2 = ____

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Fluency Check

What is the product or quotient?

4. $810 \div 9 =$ _____
5. $7 \times 30 =$ _____
6. $320 \div 4 =$ _____
7. $7 \times 700 =$ _____
8. $420 \div 6 =$ _____
9. $540 \div 6 =$ _____
10. $600 \times 5 =$ _____
11. $350 \div 5 =$ _____
12. $3 \times 50 =$ _____
13. $80 \times 6 =$ _____
14. $240 \div 8 =$ _____
15. $60 \times 7 =$ _____
16. $160 \div 4 =$ _____
17. $800 \times 8 =$ _____

Fluency Talk

How can you use place value to find the quotient of a multiple of 10 and a number?

What patterns do you use when you multiply a number by a multiple of 100?

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Multiply Fractions

Focus Question

How can I multiply fractions?

Hi, I'm Hannah.

I can multiply fractions to find out how much work I can get done in a day! I want to weld 20 go-kart frames. If it takes a quarter of an hour to weld each frame, I will multiply 20 times one-fourth to find out how long it will take.

STEM video | GO ONLINE

Name _____

Folding Fractions on a Strip

Follow the directions to fold a piece of paper to create a rectangle similar to this.

1. On a sheet of paper, label the left edge 0 and the right edge 1.

2. Fold the paper into thirds. Label the creases *A* and *B*.

3. Fold to create a crease that is halfway between 0 and *A*.
   Label the new crease *X*.

4. Fold to create a crease that is halfway between *B* and 1.
   Label the new crease *Y*.

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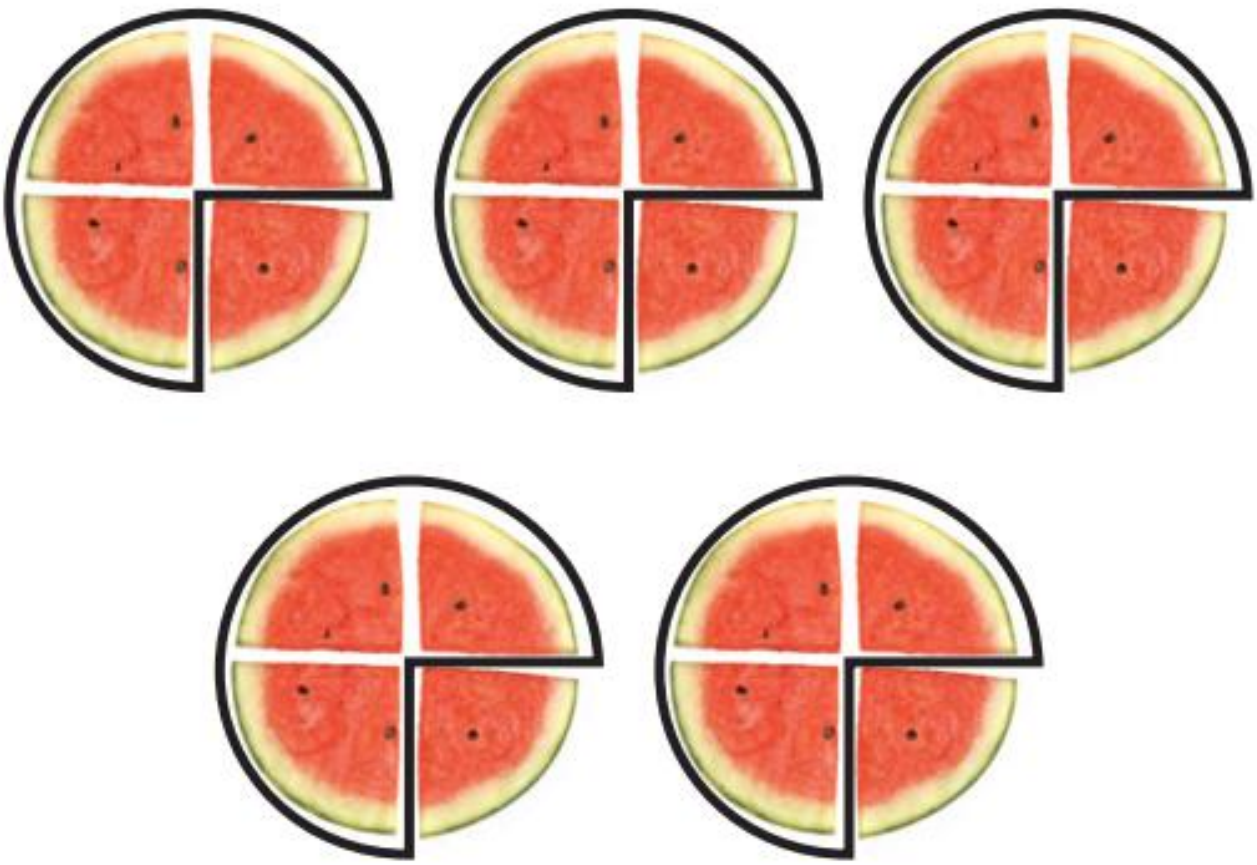
Lesson 10-1

Represent Multiplication of a Whole Number by a Fraction

Be Curious

What do you notice?
What do you wonder?



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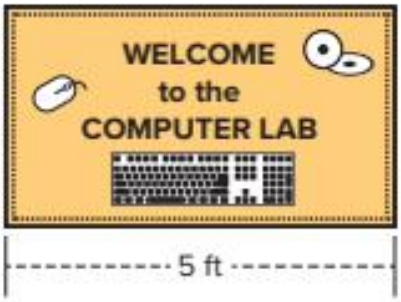
Math is... Mindset

Why is it important to have confidence in your work?

Learn

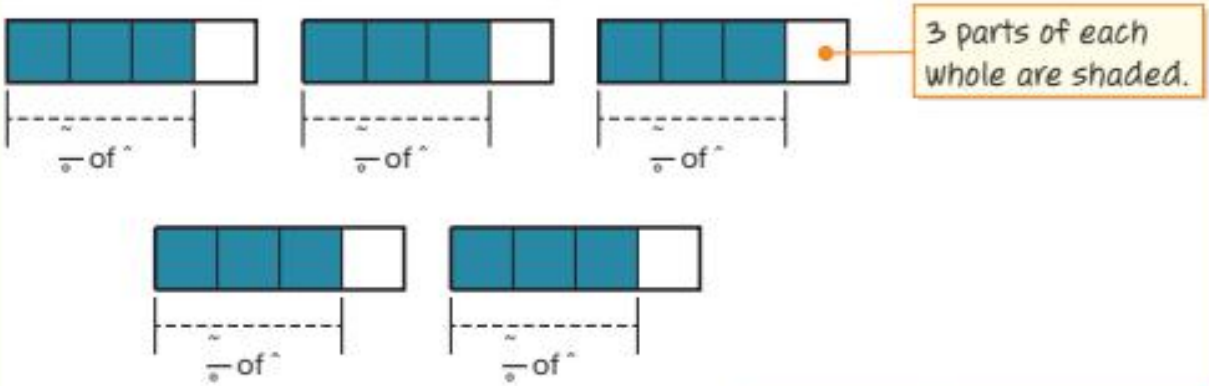
The width of this banner is $\frac{3}{4}$ of its length.

How can you determine the width of the banner?



A representation can help you solve the equation.

The 5 wholes are partitioned into fourths. $\frac{3}{4}$ of each whole is shaded.
Shade $\frac{3}{4}$ of each whole.



$3 \times \frac{1}{4}$ parts $\times$ 5 wholes $= 15\frac{1}{4}$

$\frac{3}{4} \times 5 = \frac{15}{4}$

The width of the banner is $\frac{15}{4}$, or $3\frac{3}{4}$ feet.

Math is... Generalizations

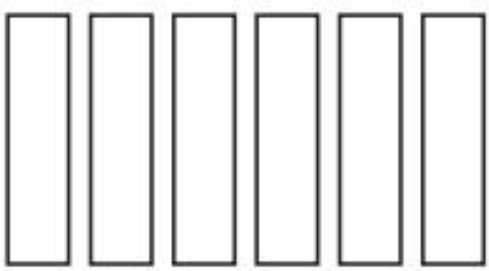
How could you determine the product without the representation?

You can use a representation to multiply a whole number by a fraction.

Work Together

What is the product? Use a representation to solve.

$\frac{2}{3} \times 6 =$ _____



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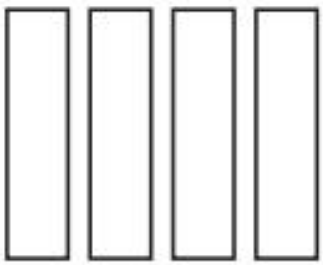
On My Own

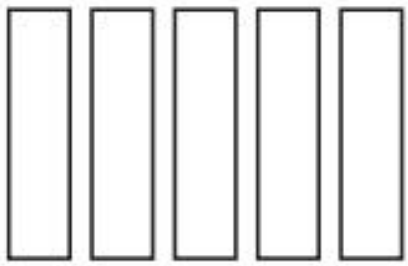
Name _____

What is the product? Use a representation to solve.

1. $\frac{3}{5} \times 4 =$ _____



2. $\frac{5}{6} \times 5 =$ _____



3. $\frac{2}{5} \times 8 =$ _____

4. $\frac{3}{8} \times 7 =$ _____

5. Anna walked $\frac{5}{8}$ of this trail. How many miles did she walk?

6. George is making 6 loaves of zucchini bread. Each loaf uses $\frac{3}{4}$ cup of grated zucchini. How many cups of grated zucchini will George use?

A. $\frac{18}{24}$ cups

B. $\frac{9}{4}$ cups

C. $\frac{18}{4}$ cups

D. $\frac{6}{4}$ cups

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7. Deena is making a bracelet that is the length shown. White beads cover $\frac{7}{10}$ of its length. What is the length of the part of the bracelet that is strung with white beads?

8. **Error Analysis** Louise multiplied $\frac{4}{5} \times 6$ and found the product $\frac{24}{30}$. Explain the error that Louise made. Then, find the correct product

9. The Johnson family ordered 6 pizzas. The family ate $\frac{7}{8}$ of each pizza. How much pizza did the Johnson family eat in all?

10. **Extend Your Thinking** Julio and Rafael share a package of 12 markers. Julio takes $\frac{2}{3}$ of the markers. Rafael takes $\frac{1}{4}$ of the markers. How many markers will each have? How many markers are left in the package?

Reflect

Explain how you can use a representation to multiply a whole number by a fraction.

Math is... Mindset

Why was it important to have confidence in your work?

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Lesson 10-2

Multiply a Whole Number by a Fraction

Be Curious

What's the question?

Some pies were entered in a baking contest. The judges ate some of each pie.

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Math is... Mindset

What helps you make decisions?

Learn

The judges of a baking contest ate $\frac{2}{3}$ of the 6 pies entered.

How pies did the judges eat?

You can use properties of operations to help you solve the equation.

$\frac{2}{3} \times 6 = p$

$2 \times \frac{1}{3} \times 6 = p$

$2 \times 6 \times \frac{1}{3} = p$

Change the order of the factors.

$12 \times \frac{1}{3} = \frac{12}{3}$

The judges ate $\frac{12}{3}$, or 4 pies.

Math is... Structure

What do you notice about the numerator of the product?

You can multiply a whole number by a fraction by multiplying the numerator of the fraction and the whole number. This becomes the numerator of the product. The denominator of the fraction is the denominator of the product.

Work Together

A swimmer trained for a race. On each of 7 days, she swam $\frac{5}{8}$ mile. How far did she swim in those 7 days?

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On My Own

Name _____

Complete the equation.

1. $\frac{3}{4} \times 6 = \frac{\square \times \square}{\square} = \frac{\square}{\square}$

2. $\frac{2}{5} \times 7 = \frac{\square \times \square}{\square} = \frac{\square}{\square}$

3. $\frac{5}{8} \times 9 =$ _____

4. $\frac{4}{9} \times 5 =$ _____

5. A bottle of water holds $\frac{2}{12}$ gallon. How much water is in this package of water bottles?

6. Arabella has a drone that she flies $\frac{3}{8}$ of a mile every day for 7 days. How far does she fly her dron ?

7. A male seal at the aquarium weighs 3 tons. A female seal weighs $\frac{3}{4}$ as much as the male seal. What is the weight of the female seal?

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8. Rafael plants vegetables in $\frac{4}{5}$ of his garden. The total area of his garden is 15 square meters. What is the area of his garden that will *not* be planted with vegetables?

9. Bea has this length of ribbon. She will use $\frac{5}{6}$ of it to wrap a present. How many inches of ribbon will she use?

10. Timora goes to school for 7 hours each day. She spends $\frac{4}{5}$ of each day in class. How many hours does she spend in class each school day?

A. 4 hours

B. $\frac{28}{5} = 5\frac{3}{5}$ hours

C. $\frac{21}{5} = 4\frac{1}{5}$ hours

D. 7 hours

11. **Extend Your Thinking** Is the product of a whole number and a fraction *always*, *sometimes*, or *never* greater than the fraction? Explain.

Reflect

How can you use equations to multiply a whole number by a fraction?

Math is... Mindset

What helped you make decisions today?

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Unit 10

Fraction Problems

Name _____

Choose the best estimate for each problem. Do not actually solve the problems.

1. Ms. Garcia is making bows from ribbon. She uses $\frac{5}{8}$ yard of ribbon for each bow. How much ribbon does she need to make 9 bows?

   Circle the best estimate.

   a. 3 yards
   b. 5 yards
   c. 7 yards
   d. 8 yards

Explain or show your thinking.

2. The price of a sweatshirt is $32. The price of a T-shirt is $\frac{3}{10}$ the price of the sweatshirt. What is the price of the T-shirt?

   Circle the best estimate.

   a. $10
   b. $16
   c. $24
   d. $31

Explain or show your thinking.

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Choose the best estimate for the problem. Do not actually solve the problems.

3. Chantal drinks $\frac{2}{3}$ cup of orange juice every morning. How many cups does she drink in 20 days?

Circle the best estimate.

a. 6 cups

b. 10 cups

c. 14 cups

d. 19 cups

Explain or show your thinking.

Reflect On Your Learning

I'm confused. | I'm still learning. | I understand. | I can teach someone else.

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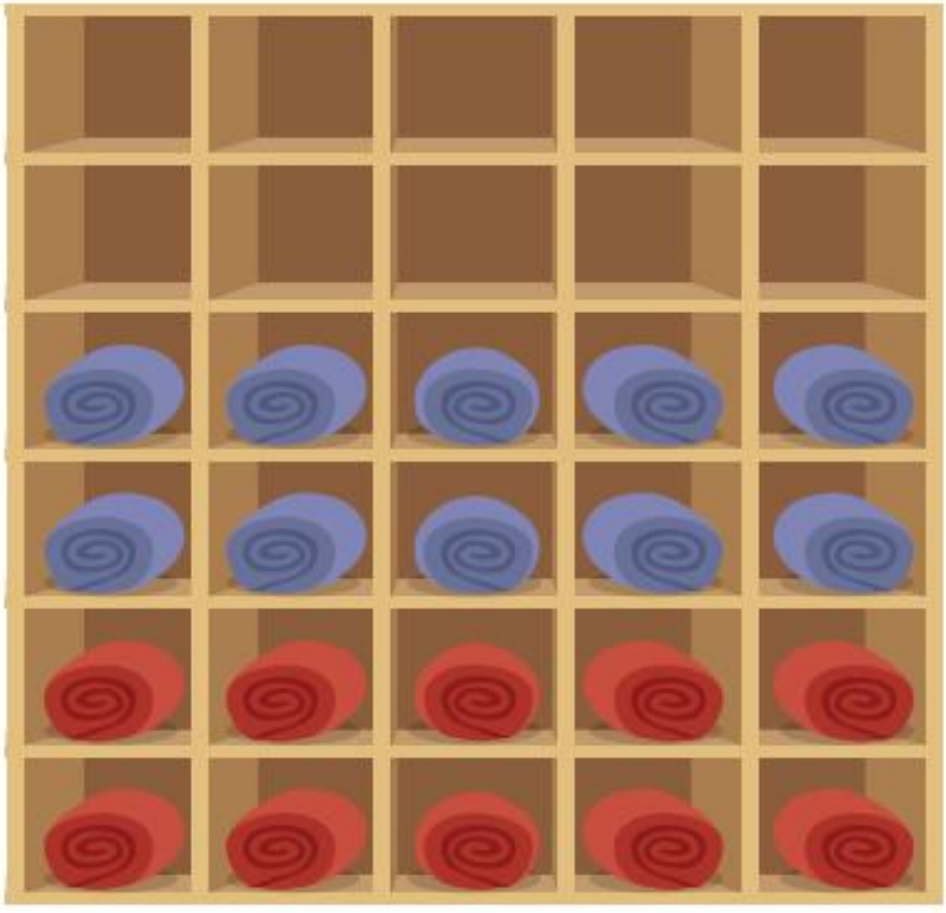
Lesson 10-3

Represent Multiplication of a Fraction by a Fraction

Be Curious

What do you notice?
What do you wonder?



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Math is... Mindset

How can you work well with a classmate even when you might diagree?

Learn

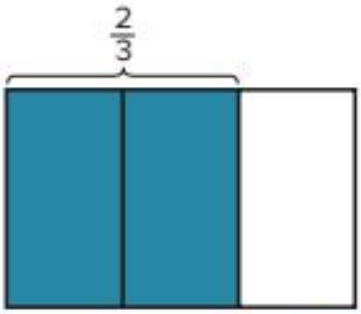
Two-thirds of a garden has flowers and $\frac{3}{4}$ of that area has sunflowers.

What fraction of the garden has sunflowers?

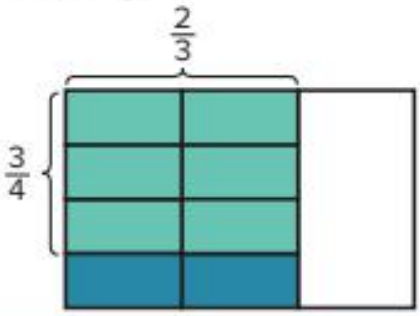
The equation $\frac{3}{4} \times \frac{2}{3} = s$ can be used to represent the problem.

You can use a representation to help you solve the equation.

Represent $\frac{2}{3}$ of a whole.



Partition each third into fourths. Shade $\frac{3}{4}$ of $\frac{2}{3}$.

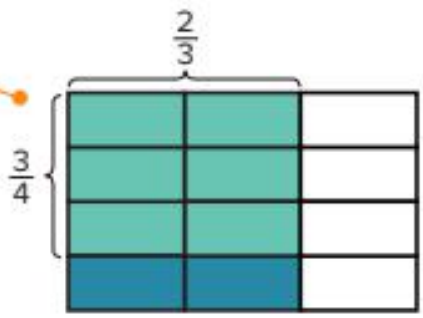


Math is... Quantities

Why do you need to find the fraction of the whole?

Write the fraction of the whole that represents $\frac{3}{4}$ of $\frac{2}{3}$.

6 equal parts represent $\frac{3}{4}$ of $\frac{2}{3}$.



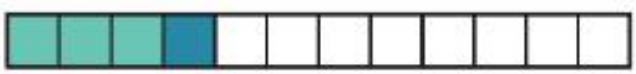
The whole is partitioned into 12 equal parts.

So, $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$.

$\frac{6}{12}$ of the garden has sunflowers.

Work Together

Explain how the tape diagram represents $\frac{1}{3} \times \frac{3}{4} = \frac{3}{12}$.



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On My Own

Name _____

What is the product? Use a representation to solve.

1. $\frac{1}{2} \times \frac{1}{2} =$ _____

2. $\frac{5}{6} \times \frac{3}{5} =$ _____

3. $\frac{5}{8} \times \frac{2}{3} =$ _____

4. $\frac{3}{4} \times \frac{3}{5} =$ _____

5. $\frac{4}{5} \times \frac{5}{6} =$ _____

6. $\frac{7}{8} \times \frac{1}{3} =$ _____

7. Matías prepared $\frac{2}{3}$ of the garden for vegetables. He is planting $\frac{3}{8}$ of the vegetable garden with potatoes. What fraction of the whole garden will be the potato garden?

8. Hazel travels $\frac{5}{8}$ mile. She ran $\frac{2}{5}$ of that distance. How far did Hazel run?

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9. Jordan saved two-thirds of his earnings last month from babysitting. He spent $\frac{3}{5}$ of that savings to buy new sneakers. How much of his earnings did he spend on sneakers?

10. Kevin wants to make half of the recipe. How many cups of walnuts pieces does he use?

A. $\frac{1}{8}$ cup

B. $\frac{1}{4}$ cup

C. $\frac{3}{8}$ cup

D. $\frac{4}{6}$ cup

RECIPE

Ingredients
1 egg
$\frac{3}{4}$ c of walnuts
$\frac{1}{2}$ tsp of baking soda

11. Using the same recipe, how much baking soda would Kevin need if he makes a recipe that is $\frac{3}{4}$ of the original recipe?

12. **Extend Your Thinking** Will the product of $\frac{3}{9} \times \frac{4}{7}$ be the same as the product of $\frac{1}{3} \times \frac{4}{7}$? Explain.

Reflect

When you multiply two fractions, is the product greater than, less than, or the same as the two fractions?

Math is... Mindset

What helped you work well with a classmate even when you might disagree?

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Lesson **10-4**

Multiply a Fraction by a Fraction

Be Curious

What could the question be?

Sol's mother gives him $\frac{2}{3}$ of a piece of raisin toast. He eats $\frac{1}{4}$ of what she gives him.

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Math is... Mindset

How does a plan help you solve a problem?

Learn

Sol's mother gives him $\frac{2}{3}$ of a piece of raisin toast. He eats $\frac{1}{4}$ of what she gave him.

What fraction of the whole piece of toast did Sol eat?

The equation $\frac{1}{4} \times \frac{2}{3} = p$ can be used to represent the problem.

Multiply the numerators.

Then multiply the denominators.

$$\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3}$$
$$= \frac{2}{12}$$

Sol eats $\frac{2}{12}$ of the piece of raisin toast.

Math is... Structure

How could you use this strategy to multiply a whole number by a fraction?

You can find the product of two fractions by multiplying the numerators and multiplying the denominators.

Work Together

Ewan colored $\frac{5}{6}$ of a piece of paper. He used purple to color $\frac{1}{4}$ of the portion of the paper he has colored. What fraction of the paper is purple?

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On My Own

Name _____

Complete the equation.

1. $\frac{1}{5} \times \frac{1}{5} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square}$

2. $\frac{2}{3} \times \frac{7}{8} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square}$

3. $\frac{2}{3} \times \frac{4}{9} =$ _____

4. $\frac{3}{7} \times \frac{4}{5} =$ _____

5. On Sunday, Aisha used $\frac{3}{4}$ of a bag of oranges to make fresh orange juice. On Monday, she used $\frac{4}{5}$ as many oranges as on Sunday. How many bags of oranges did she use on Monday?

6. Tabitha and Ally are putting together a puzzle. They have $\frac{3}{5}$ of the puzzle completed. If Tabitha put $\frac{1}{2}$ of the partly-finished puzzle togethe , what fraction of the puzzle did she put together?

7. Christina and her friends shared $\frac{2}{3}$ of a bag of snacks. Her friends ate $\frac{4}{5}$ of what was shared. How much of the bag of snacks did they eat?

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8. **Error Analysis** Joelle thinks that the product of $\frac{7}{8} \times \frac{3}{10}$ is greater than the product of $\frac{3}{8} \times \frac{7}{10}$. How do you respond to Joelle's thinking?

9. Complete the equation.

$$\frac{1}{\square} \times \frac{1}{3} = \frac{1}{24}$$

10. **STEM Connection** Saffron is baking a sweet potato pie. Her recipe calls for $\frac{2}{3}$ cup of sugar. If she wants to make $\frac{1}{2}$ of the recipe, how much sugar will she need?

11. **Extend Your Thinking** When you add fractions, the denominators stay the same. But, when you multiply fractions they do not. Explain why.

Reflect

How can you multiply fractions without using a drawing?

Math is... Mindset

How has a plan helped you solve a problem?

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Lesson 10-5

Determine the Area of Rectangles with Fractional Side Lengths

Be Curious

What do you see?

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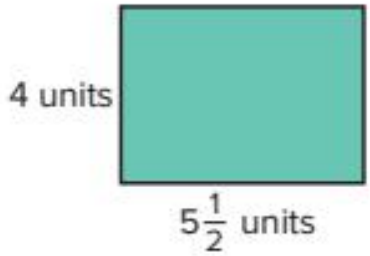
Math is... Mindset

What strategies help you work more efficiently?

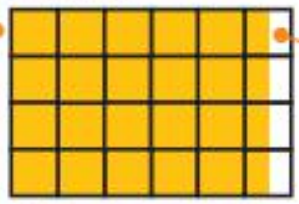
Learn

How can you find the area of this rectangle?



One Way Tile with unit squares.

Each whole unit square has an area of 1 square unit.



Each half unit square has an area of $\frac{1}{2}$ square unit.

The area of the rectangle is 22 square units.

Another Way Use the area formula, $A = l \times w$.

$$A = 4 \times 5\frac{1}{2}$$

$= 4 \times (5 + \frac{1}{2})$	Decompose $5\frac{1}{2}$.
$= 4 \times 5 + 4 \times \frac{1}{2}$	Distributive Property
$= 20 + 2$	Multiply.
$= 22$	Add.

Math is... Generalizations

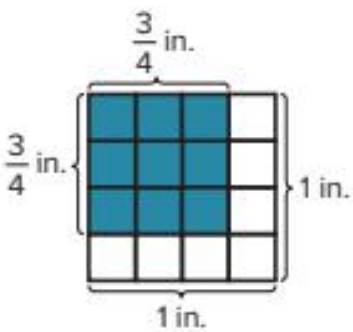
How did you use the Distributive Property to count squares?

The area of the rectangle is 22 square units.

Whether counting unit squares or using a formula, the area is the same.

Work Together

What is the area of the shaded square?



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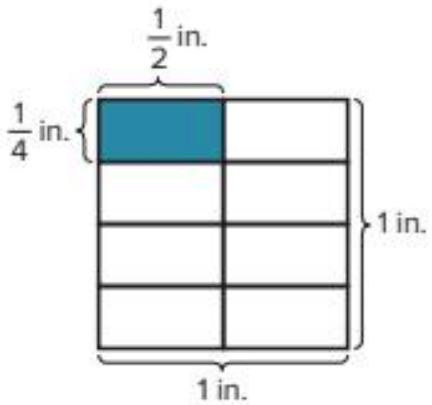
On My Own

Name _____

What is the area of the shaded rectangle?

1.



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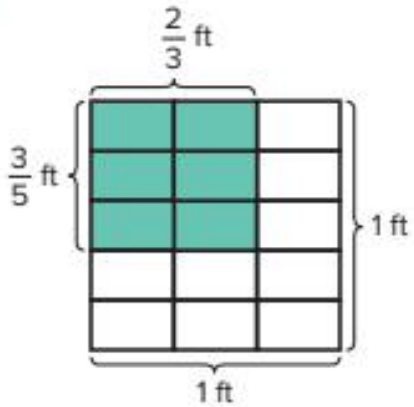

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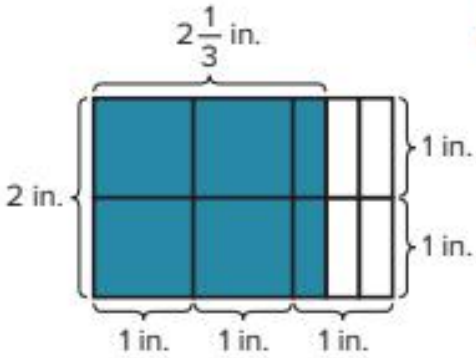

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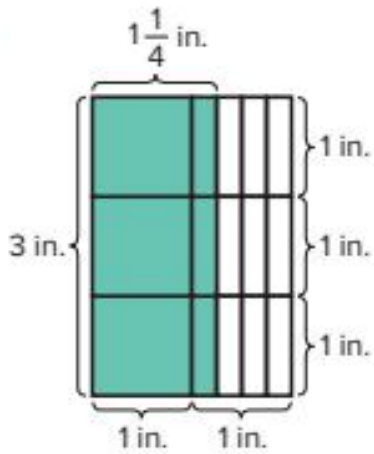

5. What is the area of a square with side lengths of $\frac{1}{3}$ inch?

6. A piece of paper is $1\frac{1}{4}$ inches long and 2 inches wide. What is the area of the piece of paper?

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7. **STEM Connection** A geologist is surveying land that is $\frac{3}{4}$ mile wide by $\frac{7}{8}$ mile long. What is the area of the land the geologist is surveying?

8. The top of a table measures $1\frac{3}{4}$ feet by 2 feet. What is the area of the tabletop?

9. A farmer plants crops in a section that is $\frac{4}{5}$-mile long by $\frac{9}{10}$-mile wide. What is the area of the section?

10. **Extend Your Thinking** A square has an area of $\frac{16}{25}$ square inches. What are the side lengths of the square? Explain your reasoning.

Reflect

How can you find the area of rectangles with fractional side lengths?

Math is... Mindset

What strategies helped you work more efficiently?

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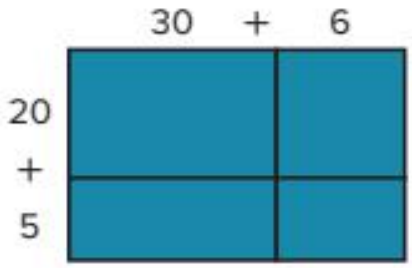
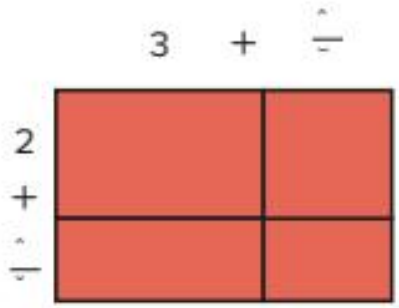
Lesson **10-6**

Represent Multiplication of Mixed Numbers

Be Curious

How are they the same?
How are they different?





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Math is... Mindset

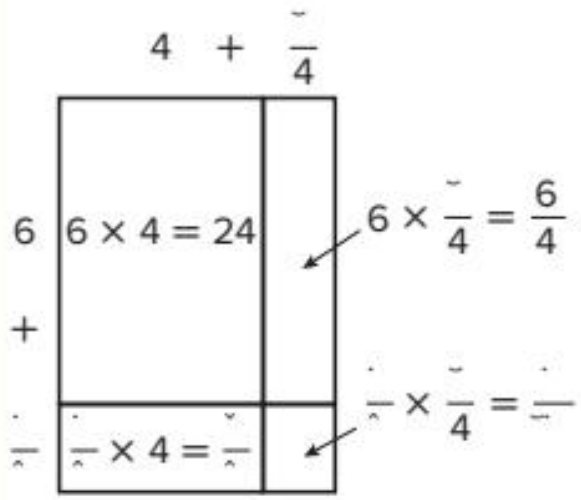
How does a different perspective help you with your work?

Learn

How can you determine $6\frac{2}{3} \times 4\frac{1}{4}$?

You can use an area model and partial products.

Decompose each factor and multiply to find partial products.



Math is... Modeling

How is this area model similar to or different from area models you have used before?

Then, add the partial products.

$24 + \frac{6}{4} + \frac{8}{3} + \frac{2}{12} = 28\frac{4}{12}$ or $28\frac{1}{3}$

So, $6\frac{2}{3} \times 4\frac{1}{4} = 28\frac{1}{3}$.

You can use an area model to represent the multiplication of mixed numbers. Then, add the partial products to determine the product.

Work Together

Use an area model to solve.

$4\frac{1}{2} \times 1\frac{3}{4} =$ _____

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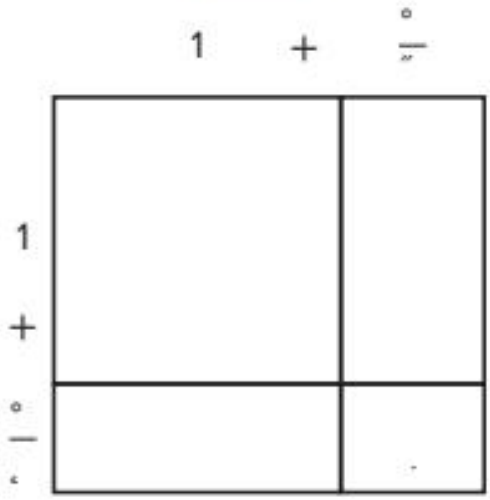
On My Own

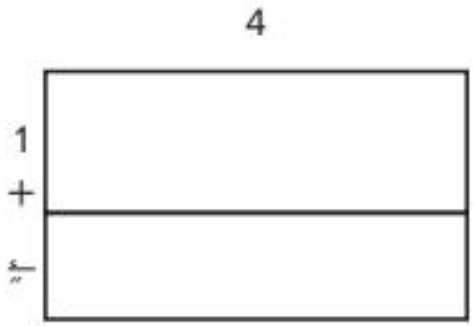
Name _____

Complete the area model. What is the product?

1. $1\frac{1}{3} \times 1\frac{1}{2} =$ _____



2. $1\frac{3}{4} \times 4 =$ _____



What is the product? Use an area model to solve.

3. $1\frac{1}{4} \times 1\frac{1}{5} =$ _____

4. $\frac{3}{5} \times 4\frac{1}{2} =$ _____

5. $3\frac{1}{3} \times 1\frac{1}{2} =$ _____

6. $2\frac{1}{4} \times 2\frac{2}{3} =$ _____

7. Aiden made $3\frac{2}{3}$ boxes of pasta for the baseball team's dinner. They ate only $\frac{1}{3}$ of that amount. How many boxes of pasta did the team eat?

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8. **STEM Connection** Sa ron used $2\frac{1}{2}$ times more flour than sugar while baking. She used $3\frac{1}{4}$ cups of sugar. How much flour did she use?

9. Kayla fills her flowerpots with $\frac{1}{2}$ quarts of potting soil. Leon has $2\frac{1}{3}$ times as much soil as Kayla. How much potting soil does Leon have?

10. **Extend Your Thinking** How is decomposing mixed numbers different from decomposing numbers that contain decimal ?

Reflect

How can area models help you represent multiplication of mixed numbers?

Math is... Mindset

How has a different perspective helped you with your work today?

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Lesson 10-7

Multiply Mixed Numbers

Be Curious

What's the question?

Taye shoveled some soil into several wheelbarrows. Rosa shoveled a number of times as much soil as Taye.

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Math is... Mindset

What are some ways to build a positive relationship with classmates?

Learn

Taye shoveled $4\frac{3}{5}$ wheelbarrows of soil. Rosa shoveled $2\frac{1}{3}$ times as much soil as Taye.

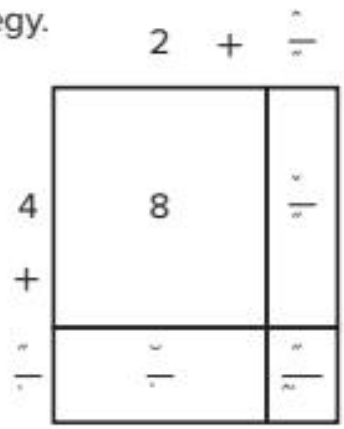
How many wheelbarrows of soil did Rosa shovel?

The equation $4\frac{3}{5} \times 2\frac{1}{3} = m$ can be used to represent the problem.

One Way Use the partial products strategy.

$$4\frac{3}{5} \times 2\frac{1}{3} = 8 + \frac{4}{3} + \frac{6}{5} + \frac{3}{15}$$

$$= 10\frac{11}{15}$$



Another Way Write each mixed number as a fraction, then multiply the fractions.

$$4\frac{3}{5} \times 2\frac{1}{3} = \frac{23}{5} \times \frac{7}{3} = \frac{161}{15} = 10\frac{11}{15}$$

Rosa shoveled $10\frac{11}{15}$ wheelbarrows of soil.

Math is... Structure

Why should the products from each strategy be the same?

To multiply mixed numbers, you can use partial products or write the mixed numbers as fractions.

Work Together

Ava is $4\frac{1}{2}$ years old. Her brother Ethan is $2\frac{1}{3}$ times as old.

How old is Ethan?

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On My Own

Name _____

What is the product?

1. $2\frac{3}{5} \times 1\frac{1}{3} =$ _____

2. $1\frac{3}{4} \times 3\frac{1}{3} =$ _____

3. $2\frac{2}{4} \times 3\frac{1}{2} =$ _____

4. $1\frac{1}{3} \times 4\frac{2}{3} =$ _____

5. $3\frac{3}{4} \times 2\frac{1}{2} =$ _____

6. $2\frac{2}{5} \times 4\frac{1}{4} =$ _____

7. $5\frac{1}{8} \times 2\frac{3}{4} =$ _____

8. $2\frac{1}{4} \times 3\frac{3}{5} =$ _____

9. The weight of Natalie's backpack is shown. Her brother's backpack weighs $2\frac{1}{4}$ times that much. How much does Natalie's brother's backpack weigh?

$6\frac{2}{3}$ lb

10. The street Michelle lives on is $1\frac{1}{2}$ miles long. The street Lucas lives on is $1\frac{2}{5}$ times as long as Michelle's street. How long is the street Lucas lives on?

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11. Benson bought this much dog food last week. This week he bought $2\frac{1}{3}$ times as much as last week. How many pounds of dog food did Benson buy this week?

12. A rectangle has a length of $1\frac{1}{3}$ yards and a width of $5\frac{1}{4}$ yards. What is the area of the rectangle?

13. **Error Analysis** Bernardo solved the following problem. Did Bernardo multiply correctly? Explain why or why not.

$5\frac{1}{2} \times \frac{2}{3} = 5\frac{2}{6}$

14. **Extend Your Thinking** Will the product of mixed numbers always be greater than the factors? How do you know?

Reflect

How can you multiply mixed numbers using fractions?

Math is... Mindset

What helped you build a positive relationship with classmates?

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Multiplication as Scaling

Be Curious

How are they the same?
How are they different?

$24 \times \frac{1}{8} = 3$	$24 \times 1 = 24$
$24 \times \frac{2}{8} = 6$	$24 \times 2 = 48$
$24 \times \frac{4}{8} = 12$	$24 \times 4 = 96$
$24 \times \frac{6}{8} = 18$	$24 \times 6 = 144$

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Math is... Mindset

What makes you feel excited when doing math?

Learn

Simon walked $\frac{2}{3}$ as far as Miguel. Ming walked $1\frac{1}{2}$ times as far as Miguel.

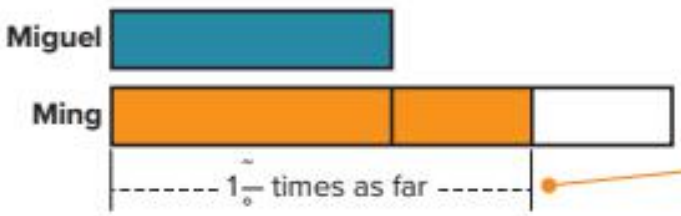
How can you can determine who walked the shortest distance and who walked the longest distance?

You can represent the problem using a tape diagram.

Compare how far Miguel and Simon walked.

Any positive number multiplied by a fraction less than 1 results in a product that is less than the first factor.

Then, you can compare how far Miguel and Ming walked.



Any positive number multiplied by a fraction greater than 1 results in a product that is greater than the first factor.

Simon walked the shortest distance.

Ming walked the longest distance.

Math is... Modeling

How does a tape diagram help you compare two distances when the distances are unknown?

You can explain how the size of the factors impacts the size of the product without performing multiplication.

Work Together

Jesse's mother tutors some students on Monday evenings. On Wednesday, she tutors $2\frac{3}{4}$ times as many students after school.

Will the number of students tutored on Wednesday be greater than or less than on Monday? Explain how you know.

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On My Own

Name _____

1. Which fraction will result in a product that is greater than $\frac{3}{4}$?

   $\frac{3}{4} \times$ _____

   A. $\frac{1}{3}$
   B. $\frac{1}{2}$
   C. $\frac{5}{8}$
   D. $\frac{5}{4}$

2. Which fraction will result in a product that is less than $\frac{8}{7}$?

   $\frac{8}{7} \times$ _____

   A. $\frac{5}{7}$
   B. $\frac{12}{6}$
   C. $\frac{10}{7}$
   D. $\frac{8}{6}$

3. Which expression has a product that is less than the first factor? Select all that apply.

   A. $42 \times \frac{1}{2}$
   B. $35 \times \frac{2}{1}$
   C. $78 \times \frac{1}{5}$
   D. $26 \times \frac{4}{5}$

4. Which expression has a product that is greater than the second factor? Select all that apply.

   A. $\frac{3}{4} \times \frac{2}{1}$
   B. $\frac{2}{1} \times 75$
   C. $26 \times \frac{3}{2}$
   D. $\frac{9}{10} \times 5$

5. In a cross-country race, Duante took $\frac{8}{9}$ as long as James to finish. ofi took $\frac{7}{8}$ as long as James to finish. Order thei race times from least to greatest.

6. Jamie is $\frac{4}{5}$ as tall as Harriet. Jenny is $1\frac{2}{5}$ as tall as Harriet. Who is the tallest? How do you know?

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7. **STEM Connection** Hannah is measuring three sheets of metal. Sheet A is $1\frac{1}{2}$ times as long as Sheet B. Sheet C is $2\frac{2}{3}$ times as long as Sheet A. How should Hannah order the sheets from least length to greatest length?

8. Tyler has three dogs of different sizes: Max, Dais , and Charlie. Daisy weighs $\frac{1}{3}$ as much as Max. Charlie weighs $\frac{3}{8}$ as much as Daisy. Who weighs the least? How do you know?

9. Hugo is organizing his books from shortest to tallest. His math book is $2\frac{1}{4}$ times as tall as his science book. His reading book is $\frac{7}{9}$ as tall as his science book. In what order should Hugo organize his books?

10. **Extend Your Thinking** What will happen to the product if a whole number is multiplied by $\frac{8}{8}$?

Reflect

How can you explain what the size of a product will be if you know the sizes of the factors?

Math is... Mindset

What made you feel excited when doing math?

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Lesson 10-9

Solve Problems Involving Fractions

Be Curious

How are they the same?
How are they different?

Brighton has 3 glasses. Each glass contains $\frac{1}{2}$ cup of orange juice. How much orange juice does she have?

Brighton has $\frac{3}{4}$ cup of juice in her glass. $\frac{1}{2}$ of the juice is orange juice. How much orange juice is in the glass?

Brighton has $\frac{3}{4}$ cup of orange juice in one glass and $\frac{1}{2}$ cup of orange juice in another glass. How much orange juice does she have?

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Math is... Mindset

What goal do you want to accomplish today?

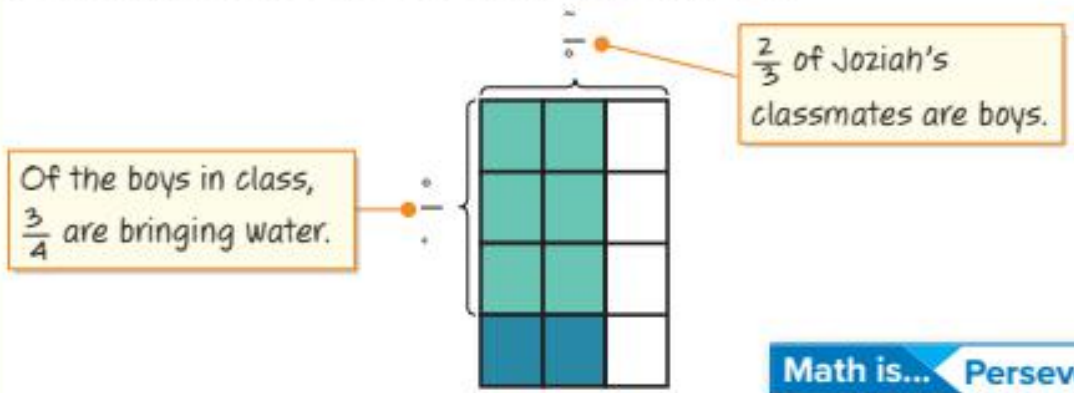
Learn

In Joziah's class, $\frac{2}{3}$ of the students are boys. The teacher asked $\frac{3}{4}$ of the boys to bring bottled water for a party.

How can you determine what fraction of the students are bringing water?

You can use a representation to help you solve the problem.

You can use an area model to solve the equation.



So, $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$.

$\frac{6}{12}$ of Joziah's classmates are bringing water.

Math is... Perseverance

How could you use another method to check your solution to this problem?

You can use any strategy you know to solve problems involving multiplying fractions.

Work Together

Victor has \$57. He spends $\frac{2}{3}$ of his money on a game. How much money did Victor spend on the game?

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On My Own

Name _____

1. Sasha's family had $\frac{3}{4}$ of a pizza left over. Sasha ate $\frac{1}{2}$ of what was left. How much of the pizza did Sasha eat?

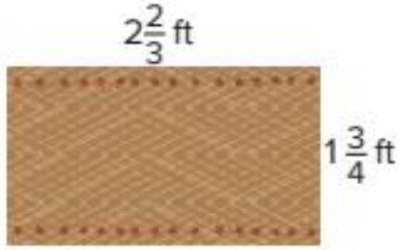
   A. $\frac{5}{8}$
   B. $\frac{3}{8}$
   C. $\frac{4}{8}$
   D. $\frac{4}{6}$

2. Jessica ran $\frac{7}{8}$ of a mile. Sheila ran $1\frac{1}{3}$ times as far as Jessica. How far did Sheila run?

   A. $1\frac{1}{2}$ mi
   B. $2\frac{1}{3}$ mi
   C. $1\frac{1}{6}$ mi
   D. $1\frac{3}{4}$ mi

3. The first hapter of a book has 40 pages. Connor read $\frac{7}{8}$ of the pages in the first chapte . Simon read $\frac{1}{5}$ of the pages that Connor read. How many pages have Connor and Simon each read?

4. What is the area of the piece of rug?



5. In a fifth grade class, $\frac{3}{5}$ of the children play an instrument. Of those, $\frac{5}{8}$ are girls. What fraction of girls in the fifth-grade class plays an instrument?

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6. **STEM Connection** Saffron has a bag of flour tha contains 8 cups of flour. The bag is $\frac{6}{7}$ full. Saffron uses $\frac{1}{3}$ of the bag to make a batch of muffins How many cups of flour does Saffron u ?

7. Maya has a flower garden. In her garden, $\frac{2}{3}$ of the flowers are roses. Of the roses, $\frac{5}{6}$ are pink. How many of the flower in Maya's garden are pink roses?

8. One fifth-grade class donated $1\frac{3}{4}$ boxes of canned goods to the food pantry. Another fifth-grade class donated $2\frac{1}{2}$ times as many boxes of canned goods. How many boxes did the second fifth-grade class donat ?

9. Daniel has a collection of stickers. Of his collection, $\frac{4}{7}$ of the stickers are round. Of the round stickers, $\frac{1}{4}$ are red. How many of Daniel's sticker collection is red and round?

10. **Extend Your Thinking** Write and solve a word problem involving multiplying two fractions that are both less than 1.

Reflect

How can you solve real world problems involving multiplication of fractions?

Math is... Mindset

What goal did you accomplish today?

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Unit Review Name _____

Vocabulary Review

Choose the correct word(s) to complete the sentence.

area	numerator	partition
area model	partial products	scaling
denominator		

1. The _____ is the bottom number of a fraction representing the total. (Lessons 10-2, 10-4)

2. The product of the dimensions of a rectangle gives the _____ of its flat surfac . (Lesson 10-5)

3. The _____ is the top number of a fraction indicating how many parts of the total. (Lessons 10-2, 10-4)

4. To find the product of a whole number and a fraction, _____ each whole representing the model by the value of the denominator. (Lesson 10-1)

5. Use a(n) _____ to find the partial products of a product. (Lesson 10-6)

6. The _____ are added to find the product. (Lessons 10-6, 10-7)

7. _____ compares the size of a product to the size of one of the factors. (Lesson 10-8)

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Review

8. What is the product? Show your work. (Lesson 10-2)

$\frac{3}{7} \times 9 =$ _____

9. A mother rabbit weighs 5 pounds. The baby rabbit weighs $\frac{2}{9}$ of the mother rabbit's weight. What is the weight of the baby rabbit? (Lesson 10-9)

10. What is the product? (Lesson 10-2)

$\frac{3}{5} \times 8 =$ _____

11. Sarah rides her bike to and from school. A round trip is $\frac{3}{4}$ mile. How many miles does she ride her bike to and from school in 5 days? (Lesson 10-9)

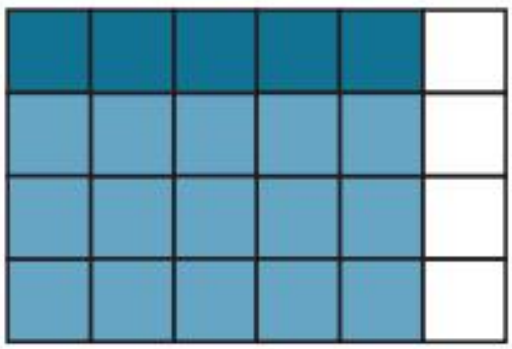
12. Solve by drawing an area model. (Lesson 10-3)

$\frac{7}{9} \times \frac{3}{4} =$ _____

13. What is the product? (Lesson 10-4)

$\frac{7}{12} \times \frac{7}{8} =$ _____

14. The area model represents what product? (Lesson 10-3)



A. $\frac{1}{4} \times \frac{3}{5}$

B. $\frac{1}{6} \times \frac{3}{4}$

C. $\frac{1}{4} \times \frac{5}{6}$

D. $\frac{4}{5} \times \frac{5}{6}$

15. Jackson shares $\frac{1}{2}$ of a bag of trail mix with his friends. They eat $\frac{2}{3}$ of the trail mix that was in the bag. How much of the bag of trail mix did they eat? (Lesson 10-9)

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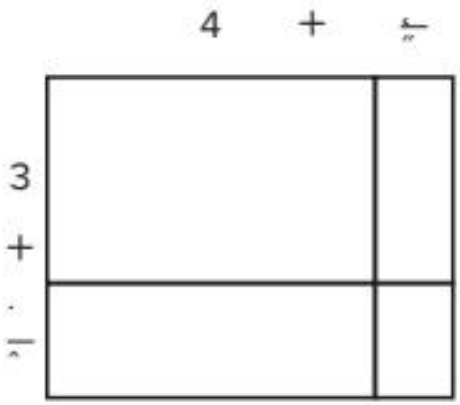
16. Find the area of a rectangle that is 10 feet long and $4\frac{2}{3}$ feet wide. (Lesson 10-7)

17. Tamara is painting a rectangular picture that is 6 inches by $4\frac{3}{4}$ inches. What is the area of the picture? (Lesson 10-9)

18. Complete the area model to find the product. (Lesson 10-5)



19. Draw an area model to find the product of $5\frac{1}{2} \times 9\frac{3}{5}$. (Lesson 10-5)

20. What is the product? (Lesson 10-6)

$2\frac{3}{4} \times 7\frac{1}{2} =$ _____

21. Hailey ran $3\frac{2}{3}$ miles yesterday. Today she is biking $2\frac{3}{4}$ times as many miles as she ran yesterday. How many miles is Hailey biking today? (Lesson 10-9)

22. Trevor, Robert, and Mark made cartoons for their coding projects. Mark's project is $1\frac{3}{5}$ times as long as Trevor's. Robert's project is $\frac{3}{4}$ times as long as Trevor's project. Order the length of their projects from least to greatest. (Lesson 10-9)

23. On Imani's phone, $\frac{3}{5}$ of the music is pop. Of the pop music, $\frac{2}{3}$ is female artists. What fraction of Imani's music is female pop artists? (Lesson 10-9)

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Performance Task

Hannah is welding three different types of rectangular shaped tables.

Part A: The coffee table has a length of $4\frac{1}{2}$ feet and a width of $3\frac{3}{4}$ feet. The side table is $\frac{4}{5}$ the area of the coffee table. What is the area of the side table?

Part B: The area of the patio table is $2\frac{1}{5}$ times the area of the side table. What is the area of the patio table?

Part C: It took her $1\frac{1}{9}$ times as long to weld the coffee table as it did to weld the side table. It took her $\frac{7}{12}$ times as long to weld the patio table as it did to weld the side table. Place in order from least to greatest the amounts of time it took Hannah to weld the tables.

Reflect

How does the size of the factors indicate whether the product will be less than both factors, less than one of the factors, or less than neither of the factors?

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Unit 10

Fluency Practice

Name _____

Fluency Strategy

You can use place value and properties of operations to divide multiples of 100.

$$24 \div 4 = 6$$
$$24 \text{ hundreds} \div 4 = 6 \text{ hundreds}$$
$$2{,}400 \div 4 = 600$$

1. Use place value to divide.

3,600 ÷ 9 = _____ hundreds ÷ 9

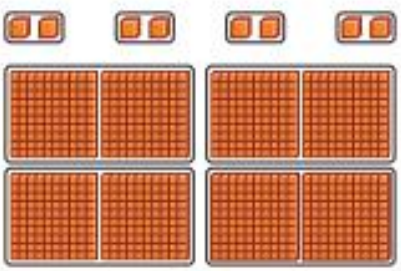
= _____ hundreds

= _____

Fluency Flash

Use the representations to complete the division facts.

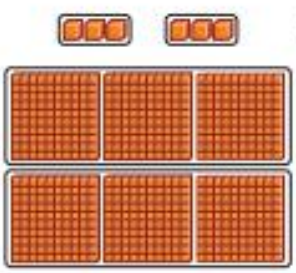
2.



8 ÷ 4 = ____

800 ÷ 4 = ____

3.



6 ÷ 2 = ____

600 ÷ 2 = ____

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Fluency Check

What is the product or quotient?

4. $4 \times 800 =$ _____
5. $180 \div 6 =$ _____
6. $600 \times 4 =$ _____
7. $240 \div 3 =$ _____
8. $3{,}600 \div 4 =$ _____
9. $1{,}800 \div 9 =$ _____
10. $300 \times 8 =$ _____
11. $900 \times 7 =$ _____
12. $2{,}400 \div 6 =$ _____
13. $5{,}600 \div 8 =$ _____
14. $4{,}900 \div 7 =$ _____
15. $480 \div 8 =$ _____
16. $270 \div 3 =$ _____
17. $2{,}100 \div 3 =$ _____

Fluency Talk

Explain how you can use place value to find the quotient of a multiple of 100 and a number.

How is dividing a multiple of a 10 by a number similar to multiplying a number by a multiple of 10?

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Divide Fractions

Focus Question

How can I divide fractions?

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IGNITE!

Name _____

Number Strings

Find the answers for Parts 1 and 2.
What do you notice about the dividends, divisors, and quotients?

Part 1

a. $8 \div 8 =$ _____

b. $8 \div 4 =$ _____

c. $8 \div 2 =$ _____

d. $8 \div 1 =$ _____

e. $8 \div \frac{1}{2} =$ _____

f. $8 \div$ _____ $=$ _____

g. $8 \div$ _____ $=$ _____

Part 2

a. $16 \div 2 =$ _____

b. $8 \div 2 =$ _____

c. $4 \div 2 =$ _____

d. $2 \div 2 =$ _____

e. $1 \div 2 =$ _____

f. $\frac{1}{2} \div 2 =$ _____

g. _____ $\div 2 =$ _____

h. _____ $\div 2 =$ _____

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Lesson 11-1

Relate Fractions to Division

Be Curious

What do you notice?
What do you wonder?

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Math is... Mindset

What are some ways you can avoid stress?

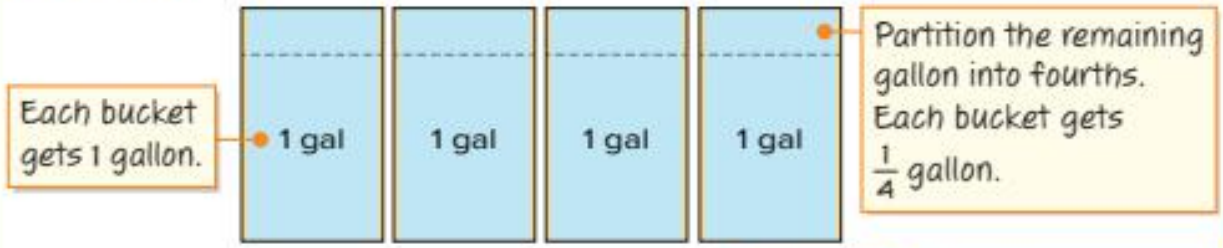
Learn

A farmer pours 5 gallons of water equally into 4 buckets.

How can you determine the amount of water in each bucket?

A division equation can represent the problem.

One Way You can use equal sharing.



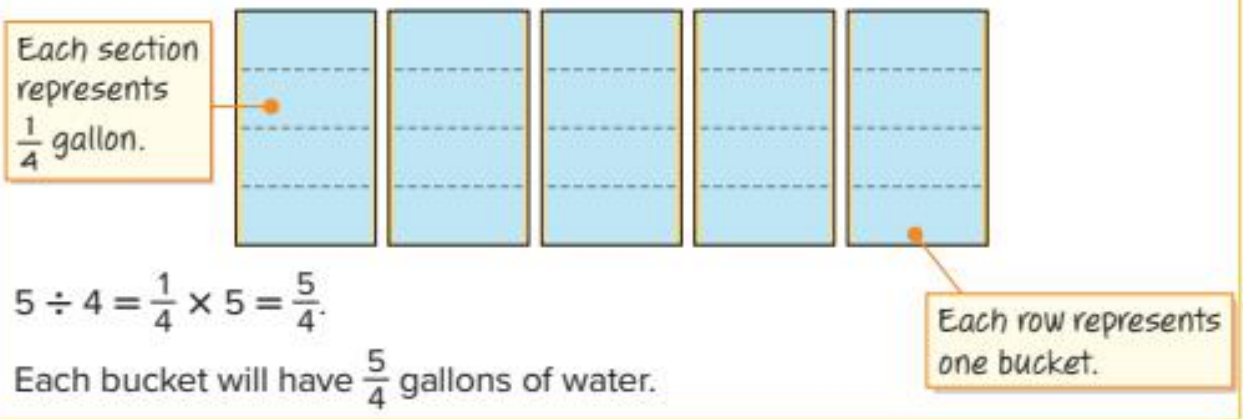
So, $5 \div 4 = 1\frac{1}{4}$.

Each bucket will have $1\frac{1}{4}$ gallons of water.

Math is... Modeling

How can a representation help you understand this problem?

Another Way Partition each gallon of water into fourths.



$5 \div 4 = \frac{1}{4} \times 5 = \frac{5}{4}$.

Each bucket will have $\frac{5}{4}$ gallons of water.

A fraction $\frac{a}{b}$ means the same as $a \div b$.

Work Together

A baker has 3 pounds of oats. He pours the oats equally into 5 bags. What is the weight of oats in each bag?

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On My Own

Name _____

1. Marie equally divides 6 bags of soil into these flowerpots. How many bags of soil are in each pot?

Complete the equation.

2. ____ ÷ ____ = $\frac{5}{9}$

3. ____ ÷ ____ = $\frac{13}{4}$

4. 3 ÷ 8 = ____

5. 7 ÷ 9 = ____

6. ____ × 7 = 7 ÷ 3

7. $\frac{1}{4}$ × 5 = 5 ÷ ____

8. A farmer pours 3 pounds of chicken feed equally into 4 bags. What is the weight of the chicken feed in each bag?

   A. $\frac{3}{4}$ pound

   B. $1\frac{3}{4}$ pounds

   C. $\frac{4}{3}$ pounds

   D. $1\frac{1}{4}$ pounds

9. An artist divides 4 pounds of clay equally into 3 containers. What is the weight of the clay in each container? Circle all correct answers.

   A. $1\frac{1}{4}$ pounds

   B. $1\frac{1}{3}$ pounds

   C. $\frac{3}{4}$ pound

   D. $\frac{4}{3}$ pounds

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10. Aki pours the same amount of aquarium pebbles from this bag into each of 3 aquariums. What is the weight of the pebbles in each aquarium?

11. What is the unknown divisor? Explain how you know.

$2 \div ____ = \frac{2}{3}$

12. **Error Analysis** Spencer divides 6 pounds of food from the food drive into 3 boxes. He says each box has $\frac{3}{6}$ pounds of food. Is he right? How do you know?

13. **Extend Your Thinking** Write a word problem involving division in which the quotient is $\frac{8}{5}$.

Reflect

How is a fraction another way to write a division expression?

Math is... Mindset

What did you do to avoid stress today?

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Lesson 11-2

Solve Problems Involving Division

Be Curious

What math do you see in this problem?

Mr. Gomez gave groups the same amount of paper. How many sheets of paper did Mr. Gomez give each group?

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Math is... Mindset

How do your strengths in other areas help you in math?

Learn

Mr. Gomez gives each of 12 groups of students the same amount of paper from a ream of paper.

How many sheets of paper will Mr. Gomez give each group?

A division equation can represent the problem.

$500 \div 12 = p$

Use partial quotients to solve.

$$\begin{array}{r|r} 12\overline{)500} & \\ -360 & 30 \\ \hline 140 & \\ -120 & 10 \\ \hline 20 & \\ -12 & 1 \\ \hline 8 & 41 \end{array}$$

Think of different ways to interpret the remainder.

Math is... Perseverance

Why are you not finished with a problem after you have found the remainder?

One Way Each group gets only full sheets of paper.

He will give each group 41 sheets of paper. He will have 8 sheets remaining.

Another Way Mr. Gomez cuts the remaining sheets of paper.

He can divide the 8 remaining sheets among the 12 groups.

$8 \div 12 = \frac{8}{12}$ or $\frac{2}{3}$

Each group will get $41\frac{2}{3}$ sheets of paper.

When solving division word problems, it is important to determine whether the quotient should be written with a remainder or as a mixed number.

Work Together

Mrs. Pierson gave each of her 25 fifth-grade students the same number of colored pencils. There were 480 colored pencils in the set. How many colored pencils did Mrs. Pierson give each child?

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On My Own

Name _____

Solve each problem. If there is a remainder, decide how to represent and interpret the remainder.

1. Grace walked the number of miles shown over the course of 7 days. She walked the same number of miles each day. How many miles did she walk each day?

2. There were 210 balloons at a fair. Each of the 50 children that attended the fair got the same number of balloons. How many balloons did each child get?

3. Dawn made 50 bracelets. She gave each of her 12 friends the same number of bracelets. How many bracelets did Dawn give to each of her friends?

Would you write the quotient for the problem with a remainder or as a mixed number?

4. Equal amounts of juice are poured into different glasses
   - **A.** remainder
   - **B.** mixed number

5. The same number of books must be put on each shelf.
   - **A.** remainder
   - **B.** mixed number

6. A dog is fed the same amount of food every day.
   - **A.** remainder
   - **B.** mixed number

7. Someone gives out the same number of flowers to each of 5 friends.
   - **A.** remainder
   - **B.** mixed number

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Solve each problem. If there is a remainder, decide how to represent and interpret the remainder.

8. A water cooler holds 80 cups of water. If 30 people each get an equal amount of water, how many cups of water does each person get?

9. A baker has this bag of flou . He puts equal amounts of flour in 4 canisters. How many pounds of flour are in each canister?

10. Ryan has 320 pencils. He gives an equal number of pencils to each of 15 friends. How many pencils does he give each friend?

11. Rose has a piece of ribbon that is 150 inches long. She is cutting the ribbon into 20 equal pieces. How long will each piece be?

12. **Extend Your Thinking** Drew has 169 toy cars that he is organizing into boxes. Each box can hold 30 cars. How many boxes does he need?

Reflect

How do you know if a quotient should be written with a remainder or as a mixed number?

Math is... Mindset

How have your strengths in other areas helped you in math?

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Lesson 11-3

Represent Division of Whole Numbers by Unit Fractions

Be Curious

What do you notice?
What do you wonder?

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Math is... Mindset

What behaviors show respect towards someone?

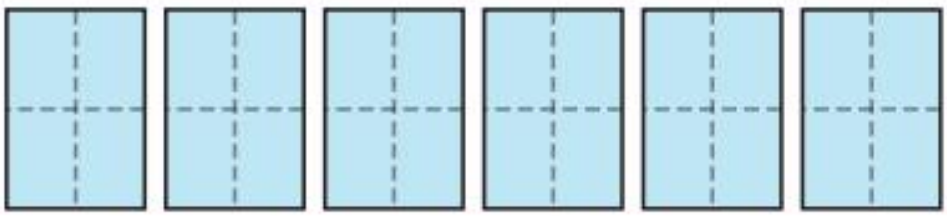
Learn

Meghan has 6 sheets of paper. She uses $\frac{1}{4}$ sheet of paper to make one card.

How many cards can Meghan make?

A division equation can represent the problem.

Partition 6 wholes into fourths.



There are 24 one-fourths in all 6 wholes.

$6 \div \frac{1}{4} = 24$.

Megan can make 24 cards.

Math is... In My World

Describe other examples of when you might need to find how many fractional parts are in a whole.

A representation can help you divide a whole number by a unit fraction.

Work Together

Joey has a 5-foot board. He cuts the board into pieces that are each $\frac{1}{3}$ foot long. How many $\frac{1}{3}$-foot boards will Joey have? Use the number line to help you solve.

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On My Own

Name _____

What is the quotient? Use a representation to solve.

1. $6 \div \frac{1}{3} =$ _____

2. $9 \div \frac{1}{4} =$ _____

3. $7 \div \frac{1}{8} =$ _____

4. $5 \div \frac{1}{5} =$ _____

5. $4 \div \frac{1}{2} =$ _____

6. $2 \div \frac{1}{9} =$ _____

7. $4 \div \frac{1}{6} =$ _____

8. $3 \div \frac{1}{10} =$ _____

9. Jamal cuts the board into pieces that are each $\frac{1}{2}$ foot long. How many pieces does he have?

7 ft

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10. **Error Analysis** Kevin has a 5 feet length of wrapping paper. He uses a $\frac{1}{3}$ foot length of wrapping paper for each present. He writes an equation to help him determine how many presents he can wrap using all of the paper. Is Kevin correct? Explain your thinking.

$$5 \div \frac{1}{3} = \frac{5}{3}$$

11. Mrs. Lopez has 2 large pizzas for her class to share. Each slice is $\frac{1}{8}$ of the pizza. How many slices of pizza does Mrs. Lopez have?

12. A house painter pours the paint from this 5-gallon can into smaller cans that each hold $\frac{1}{2}$ gallon. How many small cans will he fill? Use a fraction model to justify your answer.

13. A baker has 4 pounds of flou . She divides it evenly into bags that hold $\frac{1}{3}$ pound each. Show how many bags the baker can fill using a fraction model.

14. **Extend Your Thinking** Find a whole number and unit fraction whose quotient is 24.

Reflect

How does using representations help you understand division of a whole number by a unit fraction?

Math is... Mindset

How did you use behaviors that show respect towards someone?

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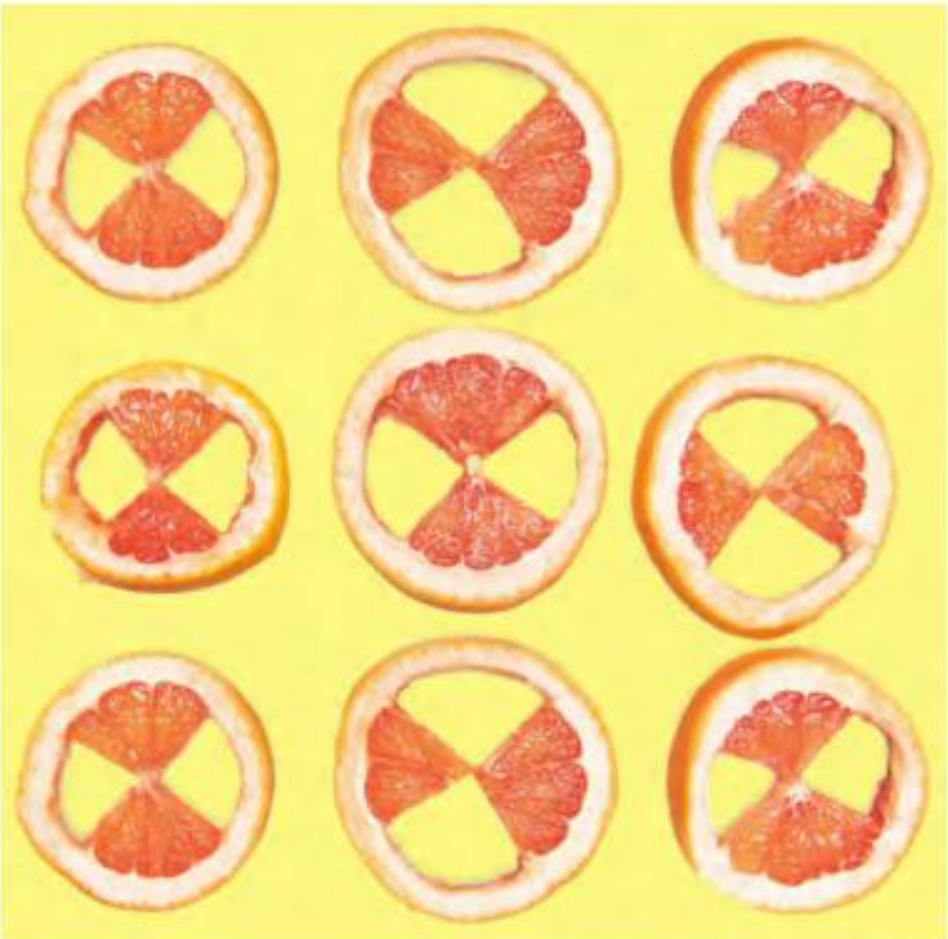
Lesson 11-4

Divide Whole Numbers by Unit Fractions

Be Curious

What do you notice?
What do you wonder?



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Math is... Mindset

How do you organize your work to be successful?

Learn

A serving size of almonds is $\frac{1}{4}$ cup.

How many servings are in this bag of almonds?

A division equation represents the problem.

You can use multiplication to determine how many one-fourths are in 10.

There are 4 one-fourths in each whole and 10 × 4, or 40 one-fourths, in 10 wholes.

$10 \div \frac{1}{4} = 40$

There are 40 servings in the bag of almonds.

Use multiplication to check the answer.

$$40 \times \frac{1}{4} = \frac{40}{4} = 10$$

The calculated quotient is correct.

Math is... Precision

What is the difference between checking an answer and assessing its reasonableness?

You can use the relationship between multiplication and division to divide a whole number by a unit fraction. You can check the answer using a related multiplication equation.

Work Together

Mika wrote $15 \div \frac{1}{3} = 5$. How can you help Mika understand dividing by unit fractions?

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On My Own

Name _____

What is the quotient?

1. $3 \div \frac{1}{5} =$ _____
2. $6 \div \frac{1}{3} =$ _____
3. $4 \div \frac{1}{4} =$ _____
4. $7 \div \frac{1}{2} =$ _____
5. $12 \div \frac{1}{3} =$ _____
6. $9 \div \frac{1}{5} =$ _____
7. $6 \div \frac{1}{6} =$ _____
8. $10 \div \frac{1}{10} =$ _____
9. $8 \div \frac{1}{7} =$ _____

10. Keri is making trail mix that contains $\frac{1}{3}$ cup of sunflowe seeds per serving. How many servings can she make with this bag?

11. A clock chimes every $\frac{1}{4}$ hour. How many times will the clock chime in 6 hours?

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12. Mia hiked 4 miles. There were trail markers every $\frac{1}{10}$ mile. How many trail markers did Mia see during her hike?

13. **STEM Connection** Poppy is visiting a park that is 15 acres. The park is divided into sections that are each $\frac{1}{3}$ acre. How many sections does the park have?

14. Jaxon has 10 gallons of punch. He pours the punch into pitchers that each hold $\frac{1}{2}$ gallon. How many pitchers does Jaxon use?

15. **Extend Your Thinking** When a whole number is divided by a fraction that is less than 1, will the quotient always be greater than the whole number? Explain why or why not.

Reflect

How does using the relationship between multiplication and division help you divide whole numbers by fractions?

Math is... Mindset

How have you organized your work to be successful?

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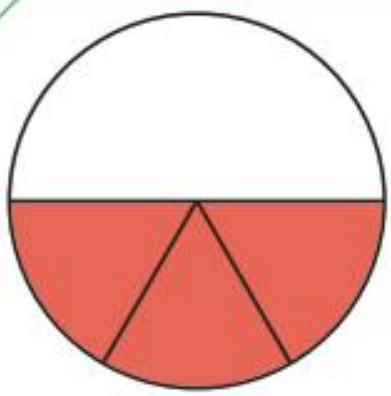
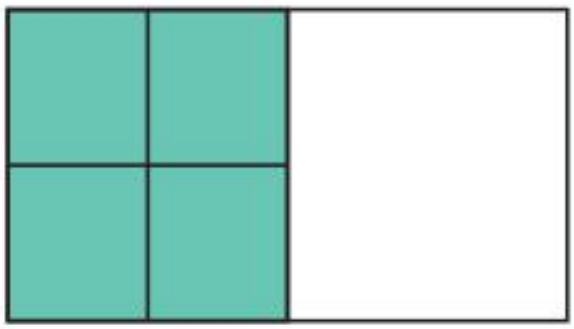
Lesson 11-5

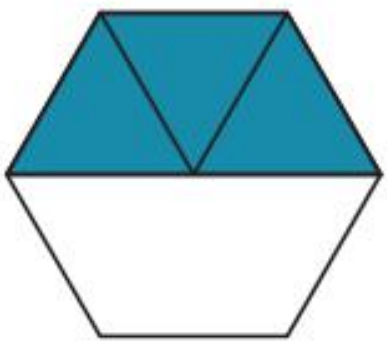
Represent Division of Unit Fractions by Non-Zero Whole Numbers

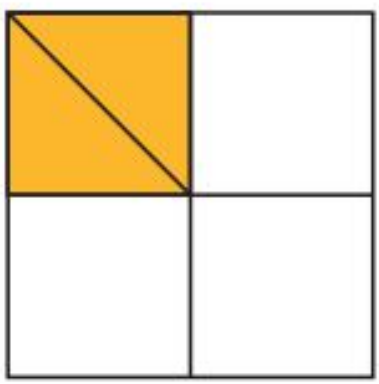
Be Curious

Which doesn't belong?









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Math is... Mindset

What consequences might there be for your decisions?

Learn

A farmer divides $\frac{1}{5}$ acre into 3 equal sections to plant vegetables.

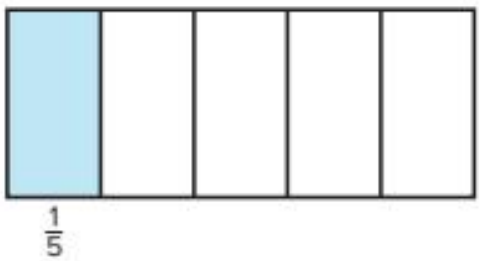
What fraction of an acre is each section?

A division equation represents the problem.

You can use a fraction model to help you solve the equation.

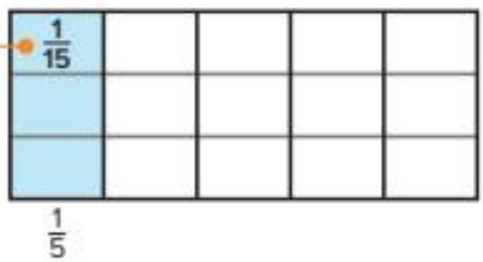
$\frac{1}{5} \div 3 = a$

Represent $\frac{1}{5}$ of a whole.



Partition the $\frac{1}{5}$ into 3 equal sections.

Each equal section is $\frac{1}{15}$ of the whole.



$\frac{1}{5} \div 3 = \frac{1}{15}$

Each section will be $\frac{1}{15}$ acre.

Math is... Connections

How is representing a fraction of a fraction similar to representing a fraction of a whole?

Work Together

Peter has $\frac{1}{4}$ gallon of water. He equally shares the water between his 2 dogs. How much water will each dog get?

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On My Own

Name _____

What is the quotient? Use a representation to solve.

1. $\frac{1}{3} \div 4 =$ _____
   - A. $\frac{1}{12}$
   - B. $\frac{4}{3}$
   - C. $\frac{1}{16}$
   - D. $\frac{1}{7}$

2. $\frac{1}{2} \div 9 =$ _____
   - A. $\frac{1}{11}$
   - B. $\frac{9}{2}$
   - C. $\frac{1}{18}$
   - D. $\frac{1}{20}$

3. $\frac{1}{8} \div 3 =$ _____

4. $\frac{1}{4} \div 2 =$ _____

5. $\frac{1}{5} \div 5 =$ _____

6. $\frac{1}{3} \div 2 =$ _____

7. Juanita shares the mixed nuts equally among herself and 3 friends. What fraction of a pound of nuts does each person receive?

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8. Raymond has $\frac{1}{3}$ gallon of water. He shares the water equally among his 3 hamsters. How much water will each hamster get?

9. A baker divides $\frac{1}{2}$ pound of wheat flour equally for 3 loaves of bread. What fraction of a pound is in each loaf?

10. **STEM Connection** Antonio is trying to determine the speed of his robot before his next competition. He measures that the robot moves $\frac{1}{2}$ foot in 5 seconds. How far does his robot move each second?

11. **Extend Your Thinking** How is dividing unit fractions by whole numbers similar to dividing whole numbers by unit fractions? How is it different?

Reflect

How can a representation help you divide a unit fraction by a whole number?

Math is... Mindset

What consequences were there for your decisions?

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Lesson 11-6

Divide Unit Fractions by Non-Zero Whole Numbers

Be Curious

Is it always true?

Dividing by a whole number is the same as multiplying by a unit fraction whose denominator is that whole number.

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Math is... Mindset

What strengths will you rely on to be successful today?

Learn

Ms. Myers pours an equal amount of milk in each of 6 cups.

If she pours all of the milk, how can you determine what fraction of a gallon is in each cup?

A division equation can represent the problem.

You can write the division equation as a multiplication equation.

$c = \frac{1}{2} \div 6$

$c = \frac{1}{2} \times \frac{1}{6}$

$c = \frac{1}{12}$

Dividing by 6 is the same as multiplying by $\frac{1}{6}$.

There is $\frac{1}{12}$ gallon in each of the 6 cups.

Use multiplication to check the answer.

$\frac{1}{12} \times 6 = \frac{6}{12} = \frac{1}{2}$

The calculated quotient is correct.

Math is... Structure

If an equation is true, why are all the equations related to it true?

Division of a unit fraction by a non-zero whole number can be rewritten as multiplication by a unit fraction.

Work Together

Explain why $\frac{1}{5} \div 3 = \frac{1}{15}$.

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On My Own

Name _____

Is the quotient correct or incorrect? How do you know?

1. $\frac{1}{2} \div 3 = \frac{1}{6}$

2. $\frac{1}{4} \div 2 = \frac{1}{2}$

3. $\frac{1}{3} \div 6 = \frac{1}{9}$

4. $\frac{1}{6} \div 4 = \frac{1}{24}$

What is the quotient?

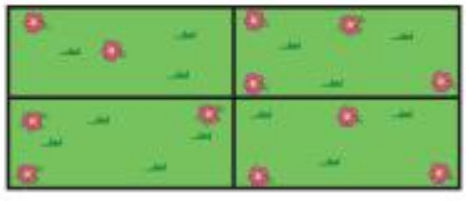
5. $\frac{1}{5} \div 5 =$ _____

6. $\frac{1}{7} \div 2 =$ _____

7. $\frac{1}{8} \div 10 =$ _____

8. $\frac{1}{9} \div 3 =$ _____

9. A garden has an area of $\frac{1}{10}$ acre. What fraction of an acre is each of the 4 sections?



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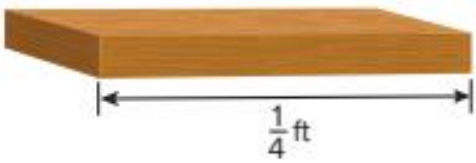
10. **Error Analysis** Peter buys $\frac{1}{4}$ pound of ham. Peter says that if he makes 2 ham sandwiches, each will have $\frac{1}{2}$ pound of ham. Is Peter correct? Explain why or why not.

11. Theo cuts this board into 4 equal sections. What is the length of each section?



12. Sasha spends $\frac{1}{2}$ of each school day in math class, science class, and history class. If the time spent in each class is the same, what fraction of the school day does Sasha spend in math class?

13. **Extend Your Thinking** When a unit fraction is divided by a non-zero whole number, will the quotient always be less than the unit fraction? Explain why or why not.

Reflect

How did you think like a mathematician today?

Math is... Mindset

What strengths did you rely on to be successful today?

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Unit 11

Which Expressions Represent the Situation?

Name _____

Read each problem. Circle the expression or expressions that could be used to solve the problem. Do not actually solve the problem.

1. Mia has $\frac{1}{2}$ pound of cheese to be split equally into 6 small boxes. Which expression or expressions could be used to find the weight of the cheese in each box?

Circle *all* correct choices.

a. $\frac{1}{2} \times 6$

b. $\frac{1}{2} \div 6$

c. $\frac{1}{2} + \frac{1}{6}$

d. $\frac{1}{2} \div \frac{1}{6}$

e. $6 \div \frac{1}{2}$

f. $\frac{1}{6} \times \frac{1}{2}$

Explain your choice(s).

2. The price of a scarf is $\frac{1}{3}$ the price of a jacket. The price of the jacket is $45. Which expression or expressions can be used to find the price o a scarf?

Circle *all* correct choices.

a. $45 \div 3$

b. $\frac{1}{3} \times 45$

c. $\frac{1}{3} \div 45$

d. $\frac{1}{3} + 45$

e. $45 \div \frac{1}{3}$

f. $45 - \frac{1}{3}$

Explain your choice(s).

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Read the problem. Circle the expression or expressions that could be used to solve the problem. Do not actually solve the problem.

3. Ari shares 4 pies among 16 friends. Which expression or expressions can be used to determine how much pie each friend receives?

Circle *all* correct choices.

a. $16 - 4$

b. $16 \div 4$

c. $4 \div 16$

d. $\frac{1}{4} \times 16$

e. $\frac{1}{16} \times 4$

f. $16 \div \frac{1}{4}$

Explain your choice(s).

Reflect On Your Learning

I'm confused. | I'm still learning. | I understand. | I can teach someone else.

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Lesson 11-7

Solve Problems Involving Fractions

Be Curious

How are they the same?
How are they different?

Erika has 3 kilograms of flour. She divides it equally among each of her 5 containers. How much flour will go in each container?

Erika has 3 kilograms of flour. She uses $\frac{1}{5}$ kilogram of flour to fill each of her containers. How many containers can she fill?

Erika has $\frac{1}{5}$ kilogram of flour. She divides it equally among each of her 5 containers. How much flour will go in each container?

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Math is... Mindset

How do you show that you are listening attentively?

Learn

Elizabeth uses all of the ribbon to decorate 6 boxes so that 4 of the faces of the boxes have the same amount of ribbon.

How long will the ribbon on each face be?

You can use strategies you know to solve the problem.

You can write and solve an equation to determine how much ribbon she will use for each box.

$3 \div 6 = b$

$3 \div 6 = \frac{3}{6} = \frac{1}{2}$

She will use $\frac{1}{2}$ foot of ribbon on each box.

Math is... Exploring

Explain another way you could have solved $3 \div 6 = b$.

Then, you can write an equation to determine the length of the ribbon on each face.

$\frac{1}{2} \div 4 = r$

$\frac{1}{2} \div 4 = \frac{1}{8}$

Elizabeth will use $\frac{1}{8}$ foot of ribbon on each face.

You can use known strategies to solve problems involving division of unit fractions.

Work Together

Martha has 5 muffins. To how many friends can she give $\frac{1}{4}$ of a muffin?

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On My Own

Name _____

1. Sonya is making muffins. The recipe use $\frac{1}{2}$ cup of flour and makes 12 mini muffins. How many cups of flour should Son use to make 6 muffi ?

   A. $\frac{1}{24}$ cup **B.** $\frac{1}{4}$ cup **C.** $\frac{1}{6}$ cup **D.** $\frac{1}{12}$ cup

2. **STEM Connection** Saffron has 4 cups of chocolate chips. She has a muffin recipe that calls for $\frac{1}{8}$ cup of chocolate chips per muffin. How many muffins ca Saffron ma e?

3. Mr. Kline is making vegetable soup. His recipe makes 12 servings and uses $\frac{1}{3}$ pound of peas. How many pounds of peas does he need to make 6 servings?

   A. $\frac{1}{36}$ pound **B.** $\frac{1}{6}$ pound **C.** $\frac{1}{4}$ pound **D.** 4 pounds

4. Ms. Jorge is dividing 4 pounds of gardening soil equally for 5 potted plants. How many pounds of soil will be in each pot?

5. A zoo has 5 pounds of fruit and 3 pounds of lettuce to divide equally among 3 gorillas. How many total pounds of fruit and lettuce will each gorilla get?

6. A relay race is $\frac{1}{2}$ mile long. How far does each person run if there are 3 members on the team?

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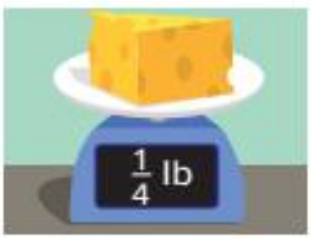
7. Shaun is making 3 bags of trail mix. He has $\frac{1}{5}$ pound of dried cranberries to divide equally among the bags. How many pounds of dried cranberries will be in each bag?

A. $\frac{1}{15}$ pound **B.** $\frac{3}{5}$ pound **C.** $\frac{1}{3}$ pound **D.** 15 pounds

8. Lucy brings 4 cakes to the bake sale. Each piece of cake is $\frac{1}{6}$ of the whole. How many pieces of cake does she have? Write and solve the equation.

9. Mike made 60 cookies. He divided the cookies equally among his 8 friends and kept the rest for himself. How many cookies did Mike give his friends, and how many did he keep?

10. Ingrid buys this piece of cheese. She uses equal amounts of it to make 3 sandwiches. How much cheese is on each sandwich?



11. **Extend Your Thinking** Write a division word problem that involves a unit fraction. Then, solve it.

Reflect

What strategy do you like to use to solve real-world problems involving the division of fractions? Explain your answer.

Math is... Mindset

How have you shown that you were listening attentively?

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Unit Review

Name _____

Vocabulary Review

Choose the correct word(s) to complete each sentence.

denominator	numerator	unit fraction
dividend	quotient	unknown
divisor	remainder	

1. A _____ represents the amount to be shared equally. (Lesson 11-2)

2. A _____ has a 1 as the numerator. (Lesson 11-3)

3. In a fraction that represents a quotient, the denominator is the same as the _____ . (Lesson 11-1)

4. A _____ of a division equation can be represented as a fraction or mixed number. (Lesson 11-1)

5. In a fraction that represents a quotient, the _____ is the same as the dividend. (Lesson 11-1)

6. The number that you are looking for when you solve an equation is called the _____ . (Lesson 11-7)

7. The _____ of a mixed number can represent a divisor. (Lesson 11-1)

8. When an improper fraction is rewritten as a mixed number the _____ is the numerator in the fraction. (Lesson 11-2)

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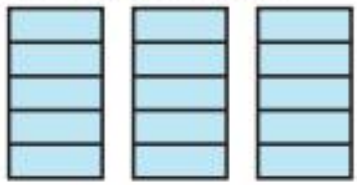
Review

9. Shaylin has 3 pounds of yogurt. She shares the yogurt equally with 3 of her friends. What is the weight of the yogurt Shaylin and each of her friends will receive? Write a division equation that represents the problem. Then, write the answer. (Lesson 11-2)

10. A rancher has 7 pounds of hay. He divides it equally into 3 troughs. How many pounds of hay does the rancher pour in each trough? Use a drawing to justify your solution. (Lesson 11-1)

11. The guitar teacher received a box of 200 guitar picks. She wants to share the guitar picks equally among her 16 students. How many guitar picks does each student receive? (Lesson 11-2)

12. Which equation can match the model? (Lesson 11-3)



A. $5 \div 3 = n$

B. $3 \div \frac{1}{5} = n$

C. $5 \div \frac{1}{3} = n$

D. $3 \div 5 = n$

13. Jason has 9 yards of wire to make necklaces. He uses $\frac{1}{3}$ yard to make each necklace. How many necklaces can Jason make? (Lesson 11-4)

14. Ciera made 12 pints of fruit punch. She is going to put $\frac{1}{2}$ pint in each glass. How many glasses can Ciera fill? rite a division equation that represents the problem. Then, write the answer. (Lesson 11-4)

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15. Which equation can be used to check the quotient of the division equation shown? (Lesson 11-4)

$16 \div \frac{1}{4} = n$

A. $4 \times \frac{1}{16} = \frac{1}{4}$

B. $4 \times 4 = 16$

C. $16 \times \frac{1}{4} = 4$

D. $64 \times \frac{1}{4} = 16$

16. Which expression has a whole-number quotient? (Lesson 11-4)

A. $9 \div \frac{1}{8}$

B. $9 \div 8$

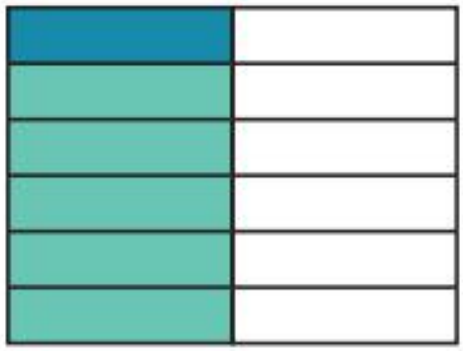
C. $8 \div 9$

D. $\frac{1}{9} \div 8$

17. How many unit fractions of $\frac{1}{10}$ are in 100? (Lesson 11-4)

18. Omar makes $\frac{1}{3}$ pound of fruit salad for a dinner party. He is going to divide the fruit salad into 6 equal servings. What fraction of a pound is one serving of fruit salad? Write a division equation that represents the problem. Then, write the answer. (Lesson 11-6)

19. Which division equation does the area model represent? (Lesson 11-2)



A. $\frac{1}{2} \div 12 = n$

B. $12 \div \frac{1}{2} = n$

C. $\frac{1}{2} \div 6 = n$

D. $6 \div \frac{1}{2} = n$

20. Which expression has a quotient that is less than the dividend and less than the divisor? (Lesson 11-5)

A. $4 \div \frac{1}{8}$

B. $32 \div 4$

C. $8 \div \frac{1}{4}$

D. $\frac{1}{8} \div 4$

21. Which equation can be used to check the quotient of the division equation? (Lesson 11-5)

$\frac{1}{4} \div 6 = n$

A. $24 \div \frac{1}{6} = 4$

B. $\frac{1}{24} \times 6 = \frac{1}{4}$

C. $4 \times 6 = 24$

D. $4 \times \frac{1}{6} = \frac{4}{6}$

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Performance Task

Antonio is programming a robot to pick fresh fruit and place it into separate containers by weight for customers to take home.

Part A: The robot picks 2 pounds of strawberries and puts $\frac{1}{5}$ pound in each container. How many containers of strawberries will the robot fill?

Part B: The robot picks $\frac{1}{3}$ pound of blueberries and puts $\frac{1}{9}$ pound in each container. How many containers of blueberries will the robot fill?

Part C: The robot picks $\frac{11}{4}$ pounds of raspberries and puts $\frac{1}{6}$ pound in each container. How many containers of raspberries will the robot fill? Will the robot be able to put the same amount of raspberries in each container? Explain your answer.

Reflect

How might you divide fractions by fractions in the real world?

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Unit 11

Fluency Practice

Name _____

Fluency Strategy

You can multiply using an algorithm.

Step 1 Multiply the ones.
$8 \times 4 = 32$
Regroup 32 as 3 tens and 2 ones.

$$\begin{array}{r} {\scriptstyle 1\ 3} \\ 314 \\ \times\ \ 8 \\ \hline 2{,}512 \end{array}$$

Step 2 Multiply the tens.
$8 \times 10 = 80$
Add the 3 tens.
$80 + 30 = 110$
Regroup 110 tens as 1 hundred and 1 ten.

Step 3 Multiply the hundreds.
$8 \times 300 = 2{,}400$
Add the 1 hundred.
$2{,}400 + 100 = 2{,}500$

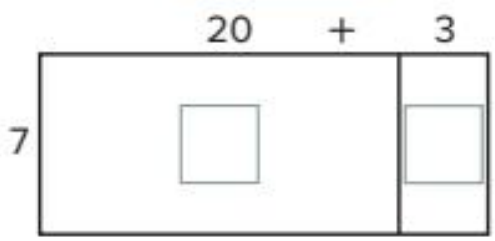
1. Use the algorithm to multiply.

$$\begin{array}{r} 456 \\ \times\ \ 9 \\ \hline \end{array}$$

Fluency Flash

Use the area model to find the product.

2. $23 \times 7 =$ _____



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Fluency Check

What is the product or quotient?

3. $4{,}500 \div 5 =$ _____

4. $2{,}800 \div 4 =$ _____

5. $480 \div 6 =$ _____

6. $160 \div 4 =$ _____

7. $\begin{array}{r} 35 \\ \times\ 8 \\ \hline \end{array}$

8. $\begin{array}{r} 456 \\ \times\ 8 \\ \hline \end{array}$

9. $350 \div 7 =$ _____

10. $240 \div 4 =$ _____

11. $3{,}200 \div 8 =$ _____

12. $180 \div 9 =$ _____

13. $\begin{array}{r} 652 \\ \times\ 7 \\ \hline \end{array}$

14. $\begin{array}{r} 289 \\ \times\ 6 \\ \hline \end{array}$

Fluency Talk

How can you multiply a 3-digit number by a 1-digit number?

How can you divide a multiple of 100?

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Measurement and Data

Focus Question

How can I convert measurement units and represent measurement data?

Hi, I'm Finn.

I want to be a construction manager. Right now, I am helping my dad order drywall for a house he is building. He needs drywall of different thicknesses. I am going to use a line plot to help my dad keep track.

STEM video | GO ONLINE

IGNITE!

Name _____

Which Sums Occur Least and Most?

Listen for directions.

A Sum	B Tallies for Your Group	C Totals for Your Group	D Combined Results
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

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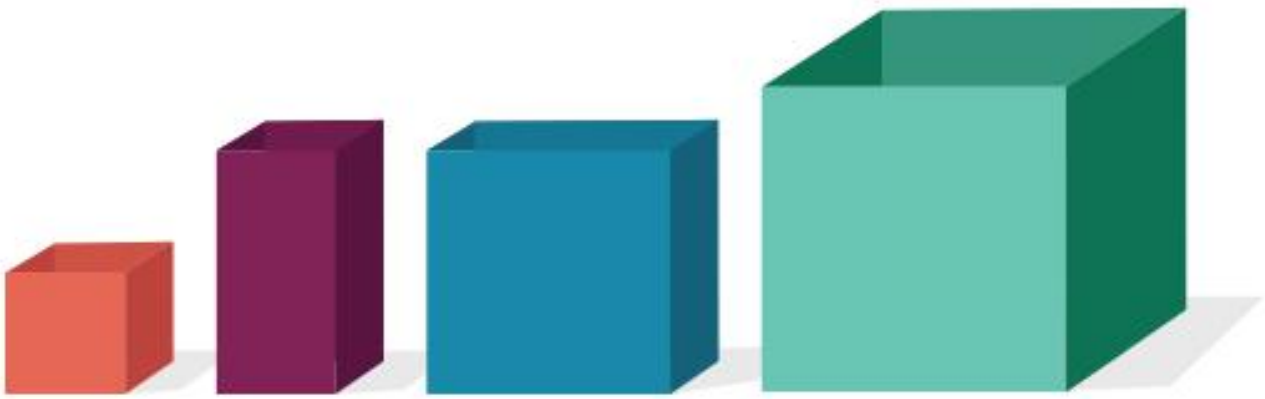
Lesson 12-1

Convert Customary Units

Be Curious

How are they the same?
How are they different?



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Math is... Mindset

What behaviors have helped you be successful in the past?

Learn

Mikayla is making frozen yogurt.

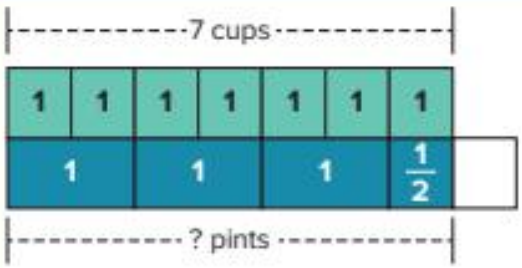
How many pints of yogurt does Mikayla need? For how many minutes does she need to freeze the yogurt?

Frozen Yogurt Recipe

7 cups yogurt
1 teaspoon vanilla extract
$\frac{2}{3}$ cup sugar

Mix yogurt, vanilla, and sugar.

Freeze for $\frac{3}{4}$ hour.



2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

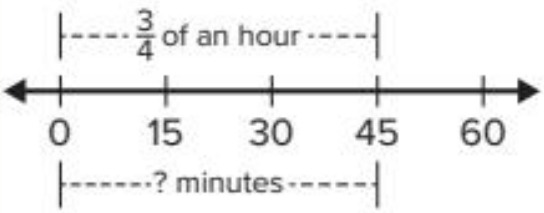
You divide to convert cups to pints.

$7 \div 2 = 3\frac{1}{2}$

Mikayla needs $3\frac{1}{2}$ pints of yogurt.

Math is... Choosing Tools

What other tool could you use to convert units?



60 seconds = 1 minute
60 minutes = 1 hour
24 hours = 1 day

You multiply to convert hours to minutes.

$\frac{3}{4} \times 60 = 45$

She needs to freeze the yogurt for 45 minutes.

You can use multiplication or division to convert customary units of measurement and units of time.

Work Together

A school hosts a walk for charity that is 4 miles long. How long is the walk in yards?

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On My Own

Name _____

Which operation will you use for the conversion? Explain your reasoning.

1. cups to fluid ounce

2. hours to days

Complete the conversion.

3. 36 in. = _____ ft

4. 2 T = _____ lb

5. 16 pt = _____ gal

6. 3 yr = _____ mo

7. 48 oz = _____ lb

8. 4 hr = _____ min

9. A basketball court is 84 feet long. How does 84 feet compare to 30 yards? Explain how you know.

10. James needs this much ribbon for an art project. How many inches of ribbon does he need?

$\frac{2}{3}$ ft

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11. During a reading contest, Mike read for a total of 120 hours. How many days is equal to 120 hours?

12. Amy's dog weighs 272 ounces. How many pounds does her dog weigh?

13. Lauren goes for a walk that is $\frac{7}{8}$ mile long. How many feet did she walk?

14. **STEM Connection** Finn needs to cut a piece of wood that is 144 inches long. He thinks it would be easier to measure the piece of wood in yards. What is the length in yards? Explain your answer.

15. **Extend Your Thinking** A rope is 100 inches long. What is the length in feet and inches? Explain your reasoning.

Reflect

How can you use multiplication and division to convert among different customary units of measure?

Math is... Mindset

What behaviors have helped you be successful in the past?

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Lesson 12-2

Convert Metric Units

Be Curious

What do you see?

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Math is... Mindset

What helps you be motivated to do your best work?

Learn

The mass of a school district's new textbook must be no more than 1.25 kilograms, and its spine width must be no greater than 2.5 centimeters. Monique measured the mass of a book in grams and its spine width in millimeters.

Can this book be the district's textbook?

Grams are smaller than kilograms.

You divide by a power of 10 to convert grams to kilograms.

$1250 \div 1000 = 1.25$

The book has a mass 1.25 kilograms.

1,000 grams = 1 kilogram

Centimeters are larger than millimeters.

You multiply by a power of 10 to convert centimeters to millimeters.

$2.5 \times 10 = 25$

The book has a thickness of 25 millimeters.

10 millimeters = 1 centimeter
100 centimeters = 1 meter
1,000 meters = 1 kilometer

Math is... Structure

How can you know when to multiply and when to divide when converting units?

You multiply or divide by a power of 10 to convert metric units of mass, length, or capacity.

Work Together

Wade and Ally converted 4,000 milliliters to liters using different methods. How can you justify their reasoning?

Wade's work:	**Ally's work:**
4,000 mL = ? L	4,000 mL = ? L
$4{,}000 \div 1{,}000 = 4$	$4{,}000 \times \frac{1}{1{,}000} = \frac{4{,}000}{1{,}000} = 4$
4,000 mL = 4 L	4,000 mL = 4 L

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On My Own

Name _____

Which operation should you use for the conversion? Explain your answer.

1. milligrams to grams

2. meters to centimeters

Complete the conversion.

3. 3 L = _____ mL

4. 100 mL = _____ L

5. 500 kg = _____ g

6. 6 km = _____ m

7. 70 mg = _____ g

8. 800 kL = _____ L

9. Andrew's height is given in centimeters. What is Andrew's height in meters?

10. **Error Analysis** A cooler contains 50 liters of water. Emily calculated to determine how many milliliters of water are in the cooler. Check Emily's work. Did she make any mistakes? If so, how could she correct her work?

50 x 100 = 5,000

There are 5,000 milliliters of water.

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11. The maximum mass an elevator can hold is 450 kilograms. What is the maximum mass in grams?

12. How many liters of water are in the pool?

13. Ryan has a sheet of paper that is 0.75 meter long. What is the length in centimeters?

14. Ada's backpack has a mass of 9,080 grams. What is the mass in kilograms?

15. **Extend Your Thinking** Explain how you can determine how many millimeters are in a kilometer.

Reflect

How can you use multiplication and division to convert metric units of measure?

Math is... Mindset

What helped to motivate you to do your best work?

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Lesson 12-3

Solve Multi-Step Problems Involving Measurement Units

Be Curious

Which doesn't belong?

quarts to gallons

yards to feet

liters to milliliters

quarts to cups

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Math is... Mindset

What helps you make sense of a situation?

Learn

Annie's mother needs to have enough water to fill 16 water bottles. Each bottle holds 475 milliliters of water.

Which water jug should Annie's mother use?

You can convert units of measurement to help you solve the problem.

How many milliliters of water does Annie's mother need to fill all the bottles?

? mL

475 — × 16 →

16 × 475 = ?

$$\begin{array}{r} 475 \\ \underline{\times\ 16} \\ 2850 \\ \underline{+\ 4750} \\ 7600 \end{array}$$

Annie's mother needs 7,600 milliliters of water.

Which water jug should she use?

7,600 mL = ? L — 1000 mL = 1L

milliliters to liters →
small to large units
You divide to convert.

7,600 ÷ 1000 = 7.6

Annie's mother needs 7.6 liters of water, so she should use the 9-L jug.

Math is... Perseverance

How can you make sense of the problem?

Knowing how to convert units of measurement can help you solve problems that have multiple steps.

Work Together

John ordered a 2-yard long sandwich for his party. His guests ate $\frac{2}{3}$ of the sandwich. How many inches of sandwich are left?

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On My Own

Name _____

1. Adrian has a roll of wrapping paper that is 3 yards long. He uses $\frac{1}{3}$ of the wrapping paper to wrap a present. What is the length, in feet, of the paper left on the roll?

   A. 1 ft

   B. 3 ft

   C. 6 ft

2. Ruby's backpack has a mass of 4 kilograms. She removes a book that has a mass of 120 grams. What is the mass of Ruby's backpack after she removes the book?

   A. 2.8 kg

   B. 3.88 kg

   C. 38.8 kg

3. Amy's family has 2 gallons of milk in the refrigerator. At dinner, her family drinks $\frac{3}{8}$ of the milk in the refrigerator. How many cups of milk are left?

4. A track at the school is 400 meters long. Jackson walks around the track $3\frac{1}{2}$ times. How many kilometers did Jackson walk?

5. **STEM Connection** Finn knows that a cubic yard of concrete weighs about 4,050 pounds. A cement truck can hold 10 cubic yards of concrete. How many tons of concrete can the truck hold?

6. Robin is selling lemonade. She makes 3 liters of lemonade and sells glasses of 250 milliliters of lemonade each. In the first hou , she sells 6 glasses of lemonade. How many liters does she have left?

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7. Brian is walking to his friend's house that is 2.6 kilometers away. He stops when he is $\frac{7}{8}$ of the way there. How many meters does he still have to walk?

8. Nell is aiming to drink the amount of water shown per day. By 3 p.m., she is $\frac{3}{4}$ of the way to her goal. How many more fl id ounces does she need to drink to reach her goal?

8 cups per day

9. Tyler wants to send his cousin 5 books that are each 1,500 grams. He has a box that can hold up to 6 kilograms. Will Tyler be able to use the box he has? Explain.

10. Gina is growing a houseplant. When she measures it at the beginning of the month, it is 3 feet tall. When she measures it at the end of the month, it is $1\frac{1}{4}$ the size it was at the beginning of the month. How many inches did the houseplant grow?

11. **Extend Your Thinking** Christa has 3 gallons of water. Jaylen has 36 pints of water. Who has more water? Explain your reasoning.

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Reflect

How can you solve multi-step word problems involving units of measurement?

Math is... Mindset

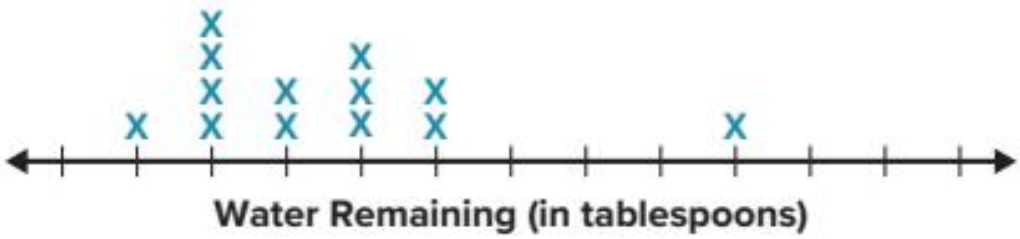
What helped you make sense of a situation?

Lesson 12-4

Represent Measurement Data on a Line Plot

Be Curious

What is the question?



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Math is... Mindset

What helps you be part of the classroom community?

Learn

Ryan filled cups with the same amount of water and set them out in a room. The next day, he measured the amount of water remaining in each cup. The table shows his findings.

$1\frac{3}{4}$	$1\frac{1}{4}$	$2\frac{1}{4}$	2	$1\frac{1}{4}$	2
$1\frac{1}{2}$	$1\frac{3}{4}$	1	$1\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{1}{2}$
$1\frac{1}{2}$	2	$1\frac{3}{4}$	2	$1\frac{1}{2}$	$1\frac{1}{4}$

How many cups had 2 tablespoons or more of water remaining?

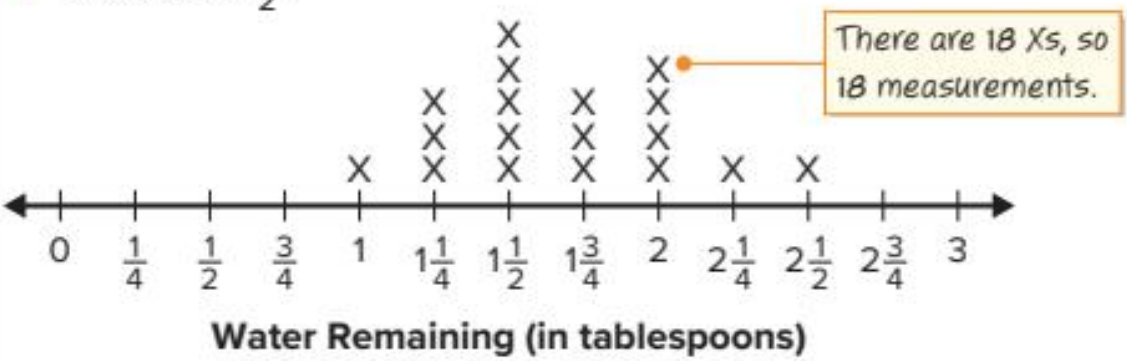
You can create a line plot to interpret the data.

There are

- 4 Xs above 2,
- 1 X above $2\frac{1}{4}$, and
- 1 X above $2\frac{1}{2}$.

Math is... In My World

When might a line plot be useful to you outside of class?



6 cups had 2 tablespoons or more of water remaining.

You can use line plots to see how many measurements there are and how the measurements are grouped together.

Work Together

How does the line plot show which measurement occurred most often?

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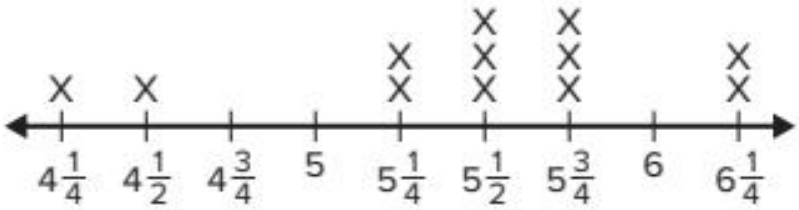
On My Own

Name _____

This line plot shows the lengths of various mice from nose to the tip of the tail. Use the line plot to answer the questions.



Mice Length (in inches)

1. How many mice are in the data set?

2. How long is the shortest mouse?

3. How long is the longest mouse?

4. Which measurement or measurements occurred the most often?

5. Which measurement or measurements occur the least often?

6. How many mice are longer than 5 inches?

7. How many mice are shorter than 5 inches?

8. What is the difference in inches between the longest and the shortest mice?

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9. Create a line plot to represent the data.

Pencil Lengths (in inches)

Pencil Lengths (in.)			
$6\frac{3}{4}$	$6\frac{1}{8}$	$6\frac{1}{2}$	$6\frac{1}{8}$
$6\frac{7}{8}$	$6\frac{3}{8}$	$6\frac{1}{8}$	$6\frac{3}{8}$

10. How did you know how to label the measurements on the line plot?

11. How did you know how many Xs to place above each measurement?

12. Are there any measurements with no Xs above them? Explain.

13. **Extend Your Thinking** Another pencil was found. It has a length that is $1\frac{1}{2}$ inches shorter than the longest pencil in the table. What is the length of this new pencil?

Reflect

How can you use line plots to interpret measurements?

Math is... Mindset

How were you part of the classroom community?

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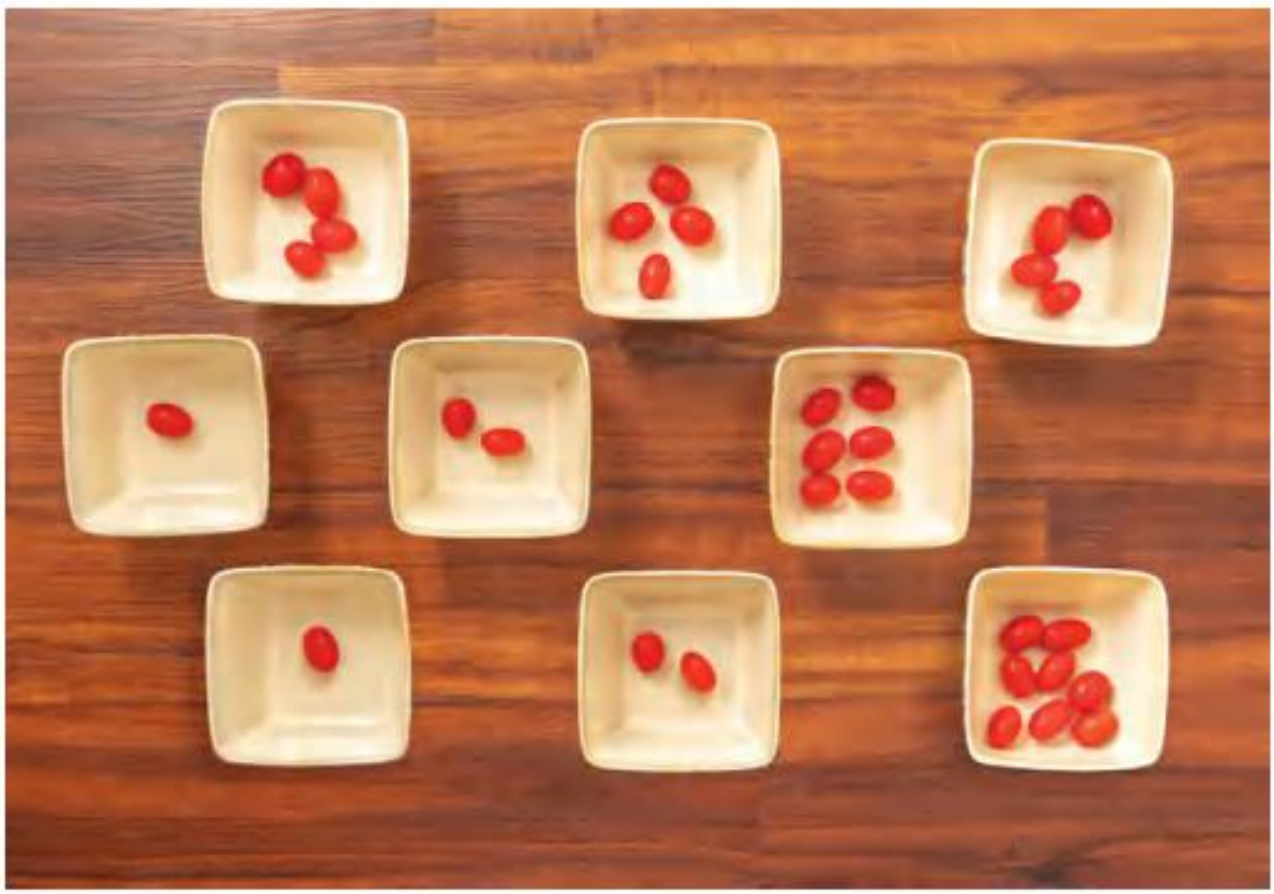
Lesson 12-5

Solve Problems Involving Measurement Data on Line Plots

Be Curious

What do you notice?
What do you wonder?



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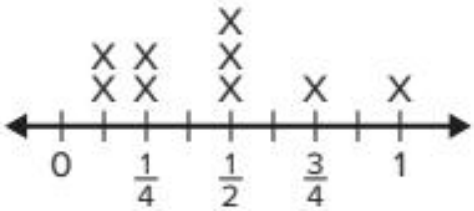
Math is... Mindset

How can you show others that you value their ideas?

Learn

A tortilla maker put $4\frac{1}{2}$ cups of corn meal in ten bowls. The line plot shows the amount of corn meal in each of nine bowls.

How much corn meal is in the tenth bowl?



Corn Meal in Each Bowl (in cups)

Determine the amount of corn meal in each of the nine bowls.

2 bowls have $\frac{1}{8}$ cup each. $2 \times \frac{1}{8} = \frac{2}{8}$

2 bowls have $\frac{1}{4}$ cup each. $2 \times \frac{1}{4} = \frac{2}{4} = \frac{4}{8}$

3 bowls have $\frac{1}{2}$ cup each. $3 \times \frac{1}{2} = \frac{3}{2} = \frac{12}{8}$

1 bowl has $\frac{3}{4}$ cup. $\frac{3}{4} = \frac{6}{8}$

1 bowl has 1 cup. $1 = \frac{8}{8}$

$\frac{2}{8} + \frac{4}{8} + \frac{12}{8} + \frac{6}{8} + \frac{8}{8} = \frac{32}{8} = 4$

The nine bowls have 4 cups of corn meal.

Math is... Quantities

What could be another way to add the amounts of corn meal?

Subtract to determine the amount of corn meal in the tenth bowl.

$4\frac{1}{2} - 4 = \frac{1}{2}$

The tenth bowl has $\frac{1}{2}$ cup of corn meal.

You can solve problems by interpreting information given in line plots and then performing operations.

Work Together

Based on the line plot above, what is the difference between the greatest amount of flour in a bowl and the least amount of flour in a bowl? Explain your answer.

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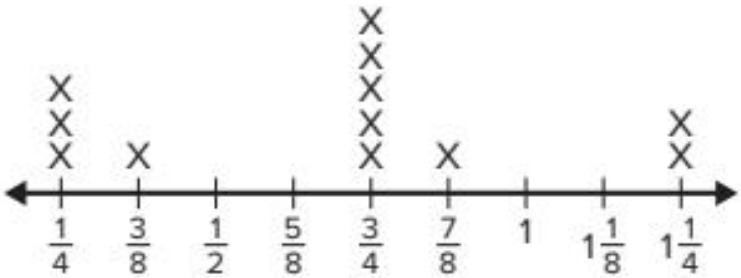
On My Own

Name _____

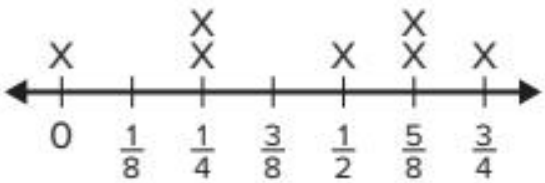
The line plot shows the weights of various mice.
Use the line plot to answer the questions.



Mice Weight (in ounces)

1. What is the combined weight of the 4 lightest mice?
2. What is the combined weight of the mice that weigh $\frac{3}{4}$ ounces?
3. What is the combined weight of all the mice?
4. What is the difference in weigh between the heaviest mouse and the lightest mouse?

The line plot shows the amount of rain that fell each day in a week.
Use the line plot to answer the questions.



Daily Rainfall (in inches)

5. What was the total amount of rainfall in inches during the week?
6. How many days did it rain during the week?
7. On the days it rained, what is the difference between the greatest and least amount of rainfall?
8. If the same amount of rain falls the following week, what is the total amount of rainfall over two weeks?

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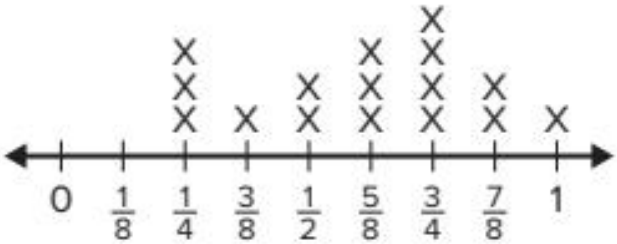
The line plot shows how much water each player drank during a basketball game. Use the line plot to answer the questions.



Water Drank (in gallons)

9. How many players drank water during the basketball game?

10. What is the difference between the greatest amount of water drank and the least amount of water drank?

11. **Error Analysis** Tony wants to find the total amount of water players drank during the game.

$\frac{1}{4} + \frac{3}{8} + \frac{1}{2} + \frac{5}{8} + \frac{3}{4} + \frac{7}{8} + 1 = 4\frac{3}{8}$ gallons

Is Tony's work correct? Explain why or why not.

12. **Extend Your Thinking** Why is being able to solve problems involving data on line plots helpful for analyzing data?

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Reflect

How can you use data displayed on a line plot to solve problems?

Math is... Mindset

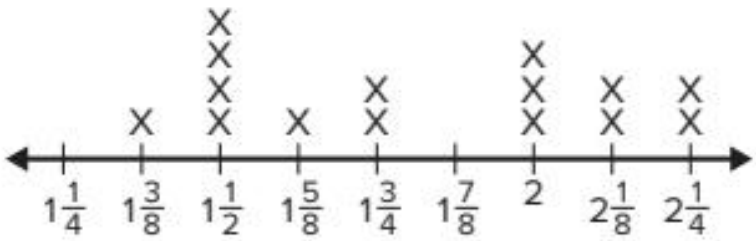
How did you show others that you value their ideas?

Unit 12

Line Plots

Name _____

For a science assignment, Candice tracked the amount of sugar that she consumed at lunch for 15 days. She recorded the data in a line plot.



Sugar Consumed (in teaspoons)

Use the line plot to choose the correct equation below. Do not solve the equation.

1. What is the difference betwee the greatest amount of sugar and the least amount of sugar that Candice consumed at lunch?

a. $2\frac{1}{4} - 1\frac{1}{4} = ?$

b. $2\frac{1}{4} - 1\frac{3}{8} = ?$

c. $1\frac{1}{2} - 1\frac{3}{8} = ?$

Explain your choice.

2. What is the total amount of sugar Candice consumed for the days she tracked 2 or more teaspoons?

a. $6 + 4\frac{1}{4} + 4\frac{1}{2} = ?$

b. $2 + 2\frac{1}{8} + 2\frac{1}{4} = ?$

c. $2\frac{1}{8} + 2\frac{1}{8} + 2\frac{1}{4} + 2\frac{1}{4} = ?$

Explain your choice.

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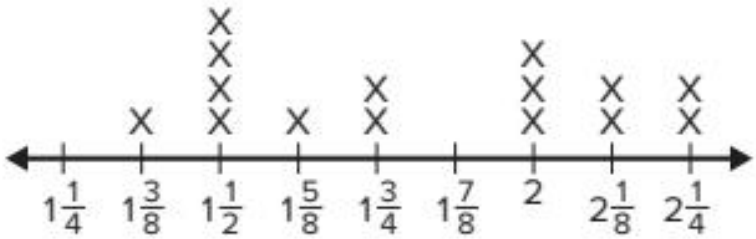
For a science assignment, Candice tracked the amount of sugar that she consumed at lunch for 15 days. She recorded the data in a line plot.



Sugar Consumed (in teaspoons)

Circle true or false.

3. On the days that Candice tracked 2 teaspoons of sugar or less, she consumed a total of less than 7 teaspoons of sugar.

True False

Explain your choice.

4. During the 15 days, Candice consumed more than 24 teaspoons of sugar in all.

True False

Explain your choice.

Reflect On Your Learning

I'm confused. I'm still learning. I understand. I can teach someone else.

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Unit Review

Name _____

Vocabulary Review

Choose the correct word(s) to complete the sentence.

capacity	customary system	length	metric system
convert	data	line plot	weight
		mass	

1. Information collected from a survey or experiment is called _____. (Lesson 12-4)

2. The _____ is the measurement system based on powers of 10 with units such as meter, gram, and liter. (Lesson 12-2)

3. To _____ a measurement to another measurement means to change the unit of measure used but not the quantity or amount. (Lesson 12-1)

4. The _____ is the amount a container can hold. (Lesson 12-1)

5. A measurement system that includes units such as foot, pound, and quart is the _____. (Lesson 12-1)

6. A _____ is a type of graph that uses columns of Xs or dots above a number line to show data. (Lesson 12-4)

7. _____ measures the amount of matter in an object. (Lesson 12-2)

8. _____ is a measure of distance. (Lesson 12-2)

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Review

9. What operation should you use to convert seconds to minutes? Explain your answer. (Lesson 12-1)

10. How many meters are equal to 3 kilometers? (Lesson 12-2)

11. Jolanna has $1\frac{1}{2}$ yards of decorative tape. She uses 1-inch pieces for her scrapbook. How many 1-inch pieces of decorative tape does she have? (Lesson 12-3)

A. 24 pieces

B. 36 pieces

C. 54 pieces

D. 90 pieces

12. It is recommended that a person sleep 8 hours every night. How many minutes does this person sleep in a year? (Lesson 12-1)

A. $48\frac{2}{3}$ minutes

B. 2,920 minutes

C. 175,200 minutes

D. 10,512,000 minutes

13. The art teacher has $3\frac{1}{4}$ gallons of paint for a mural on the wall. The students in fifth grade use $1\frac{1}{2}$ gallons. How many quarts of paint are left? (Lesson 12-3)

14. How many meters equal 400 centimeters? (Lesson 12-2)

15. Catherine has a piece of fabric that is 3,200 centimeters long. She needs fabric pieces that are 1 meter long for her quilt. How can she determine the number of 1-meter long pieces she has for her quilt? (Lesson 12-3)

16. Jamal picked 983 grams of blueberries. How many kilograms of blueberries did he pick? (Lesson 12-3)

17. An Olympic-size pool is 50 meters long. How can you determine the length in centimeters? (Lesson 12-3)

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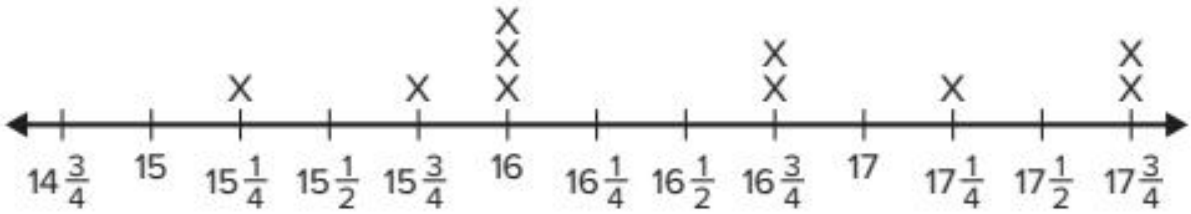
The line plot shows the length of the best long jump for each athlete at a Track and Field meet. Use the line plot to answer the questions.



Best Long Jump (in feet)

18. How many athletes are represented on the line plot? (Lesson 12-4)

19. How long is the longest jump? (Lesson 12-4)

20. How long is the shortest jump? (Lesson 12-4)

21. What measurement(s) occurred most often? (Lesson 12-4)

22. How many jumps are longer than 16 feet? (Lesson 12-4)

23. How many jumps are 16 feet or shorter? (Lesson 12-4)

24. What does no mark above a measurement mean? (Lesson 12-4)

25. What is the difference between the greatest jump length and the least jump length? (Lesson 12-5)

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Performance Task

A town is redesigning a park. It will include a tree house.

Part A: The tree house, that the architect designed has a rectangular floor. He will use wooden tiles that are 20 centimeters wide and 40 centimeters long. How many tiles will he need for a floor that is 4 meters wide and 8 meters long?

Part B: The architect plans to use wooden boards to build the walls. The boards will be different lengths. The construction manager needs to see what size boards he currently has to determine what he needs to purchase. Create a line plot to show his current inventory listed in the table.

Current Inventory	
Length (feet)	**Total**
$8\frac{1}{4}$	4
7	1
$7\frac{3}{4}$	2
$6\frac{3}{4}$	3
$7\frac{1}{4}$	1
8	2

Reflect

How can you use line plots to make decisions about a data set?

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Unit 12

Fluency Practice

Name _____

Fluency Strategy

You can multiply 46 × 27 using an algorithm.

Step 1	Step 2	Step 3
Multiply 46 × 7.	Multiply 46 × 20.	Add partial products.
$\begin{array}{r} {}^{4} \\ 46 \\ \times\ 27 \\ \hline 322 \end{array}$	$\begin{array}{r} {}^{1} \\ 46 \\ \times\ 27 \\ \hline 322 \\ +\ 920 \end{array}$	$\begin{array}{r} 46 \\ \times\ 27 \\ \hline 322 \\ +\ 920 \\ \hline 1{,}242 \end{array}$

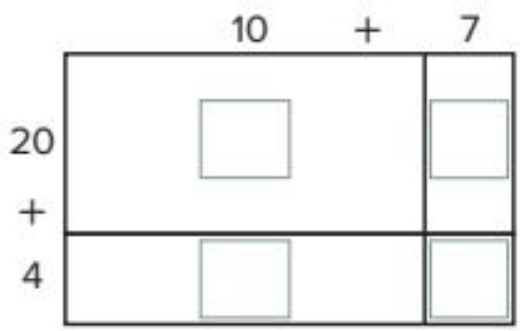
1. Use the algorithm to multiply.

$$\begin{array}{r} 86 \\ \times\ 92 \\ \hline \end{array}$$

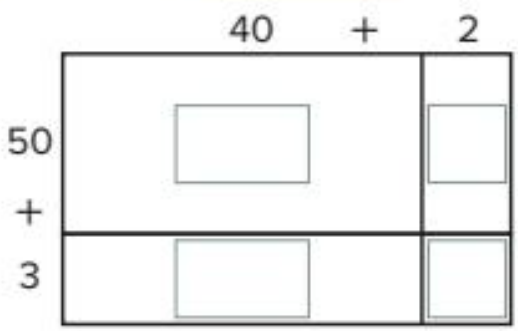
Fluency Flash

Use the area model to find the product.

2. 24 × 17 = _____



3. 53 × 42 = _____



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Fluency Check

What is the product or quotient?

4. 45
× 28

5. 478
× 4

6. 27
× 23

7. 67
× 98

8. 2,500 ÷ 5 = _____

9. 2,400 ÷ 4 = _____

10. 57
× 16

11. 275
× 7

12. 358
× 7

13. 64
× 9

14. 4,800 ÷ 6 = _____

15. 2,100 ÷ 7 = _____

Fluency Talk

Explain to a friend what partial products are.

How can you multiply a 3-digit number by a single-digit factor?

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Geometry

Focus Question

How can I use the coordinate plane and identify and classify 2-dimensional figures?

Hi, I'm Sam.

When I become an architectural drafter, I will use 2-dimensional figures to design buildings! To help me do my job, I will need to understand the properties of 2-dimensional shapes.

STEM video | GO ONLINE

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Name _____

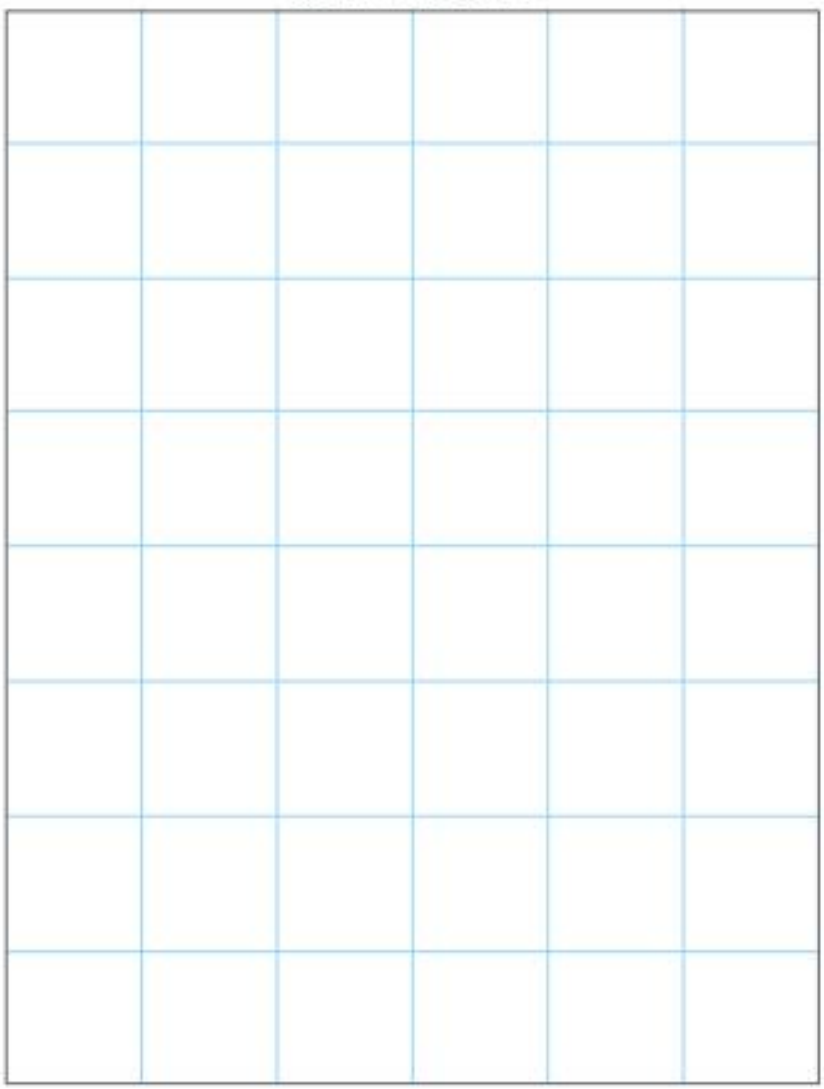
Tetrominoes

Use the grid to create tetrominoes.

Domino

Triominoes

Tetrominoes



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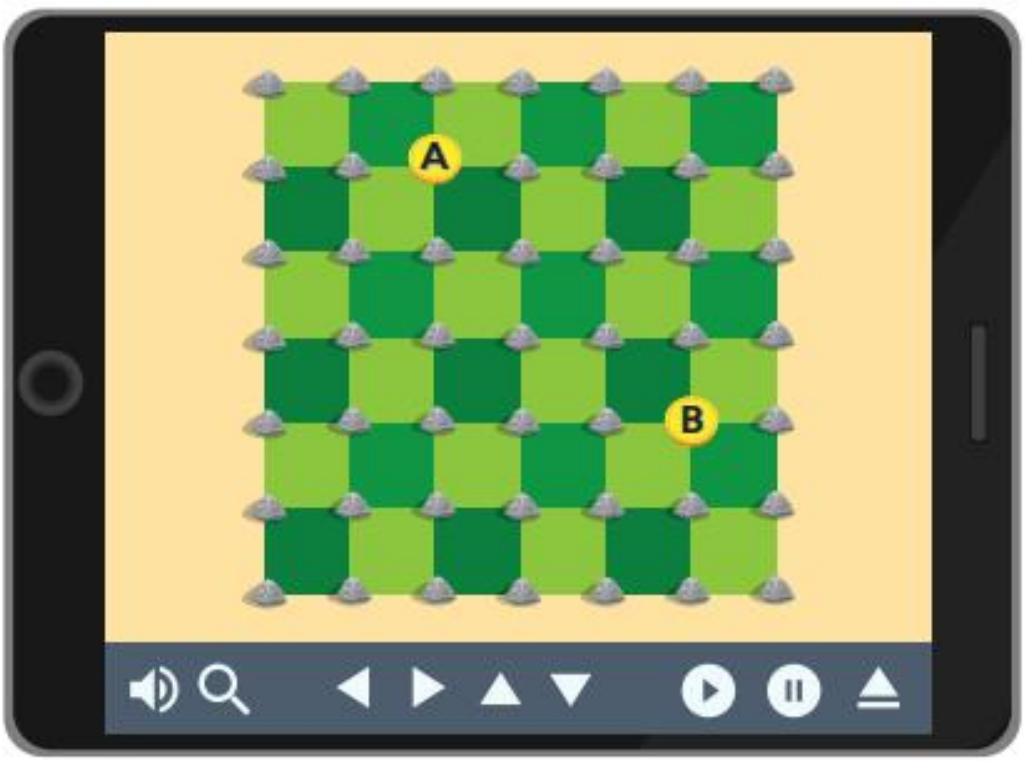
Lesson 13-1

Understand the Coordinate Plane

Be Curious

What do you notice?
What do you wonder?



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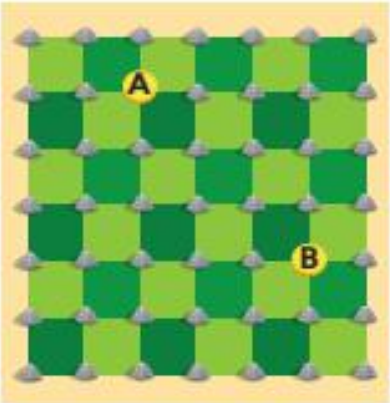
Math is... Mindset

How can working as a team help you achieve your goal?

Learn

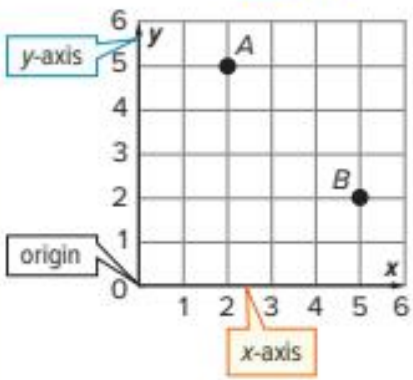
Erika designed a game that is played on this grid.

How can you describe the locations of *A* and *B*?

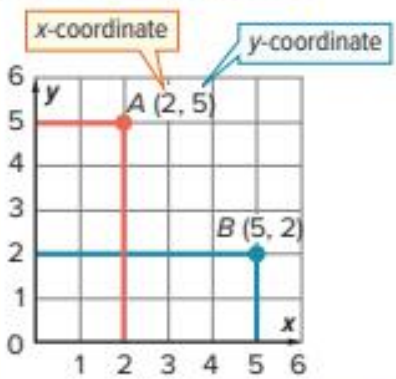


You can use the **coordinate** plane to describe the locations of *A* and *B*.

The coordinate plane has a horizontal number line called the **x-axis** and a vertical number line called the **y-axis**. The two lines intersect at the **origin**.



An **ordered pair** describes each point on the coordinate plane. An ordered pair has an **x-coordinate** and a **y-coordinate**.

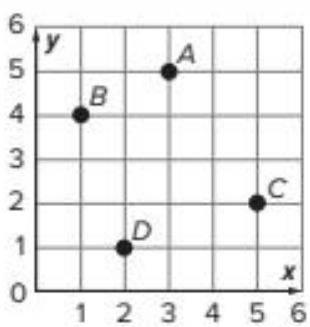


Math is... Explaining

Why does an ordered pair need to be ordered?

Work Together

What ordered pairs describe points *A*, *B*, *C*, and *D*?



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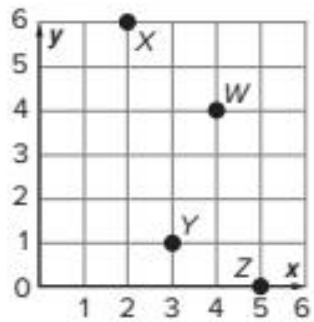
On My Own

Name _____

Use the coordinate plane to answer exercises 1–7.



1. What ordered pair describes point *W*?

2. What ordered pair describes point *X*?

3. What ordered pair describes point *Y*?

4. What ordered pair describes point *Z*?

5. What ordered pair describes the origin?

6. How did you find the *x*-coordinate for each ordered pair?

7. How did you find the *y*-coordinate for each ordered pair?

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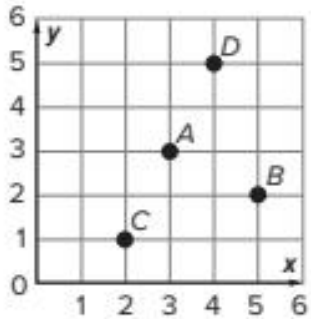
Charlie gave his friends these locations for a scavenger hunt. What are the ordered pairs that describe the locations on the coordinate plane?



8. Point *A*

9. Point *B*

10. Point *C*

11. **Error Analysis** Charlie tells his friends that point *D* is at (5, 4). His friends go to the wrong spot. Explain why.

12. **Extend Your Thinking** A new point, *E*, is two units from point *A*. Give two possible ordered pairs for *E*.

Reflect

How can you determine the ordered pair that describes a point on the coordinate plane?

Math is... Mindset

How did working as a team help you achieve your goal?

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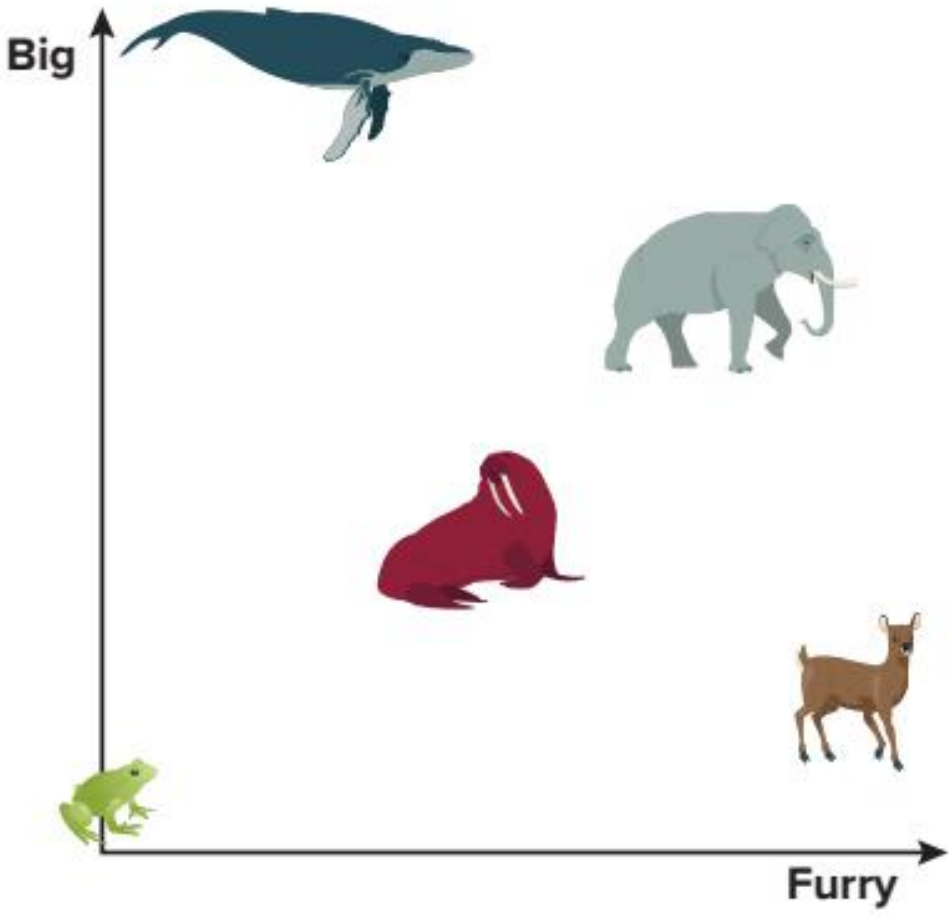
Lesson 13-2

Plot Ordered Pairs on the Coordinate Plane

Be Curious

What do you notice?
What do you wonder?



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Math is... Mindset

How can being flexible in your thinking help you make good decisions?

Learn

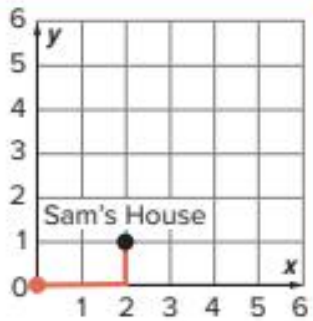
How can you determine the location of Sam's House and School on a coordinate plane?

Place	Ordered Pair
Sam's House	(2, 1)
School	(5, 5)
Park	(2, 5)
Jeremy's House	(5, 1)

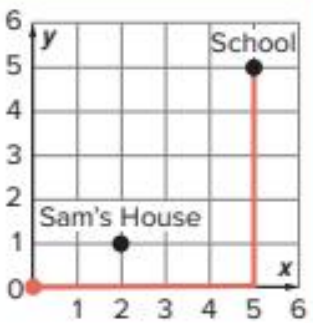
The *x*-coordinate for Sam's House is 2. Start at the origin and go right 2 units on the *x*-axis.

The *y*-coordinate for Sam's House is 1; go up 1 unit.

Draw the point at (2, 1) and label it "Sam's House."



You can follow the same process to plot the point (5, 5) for School.

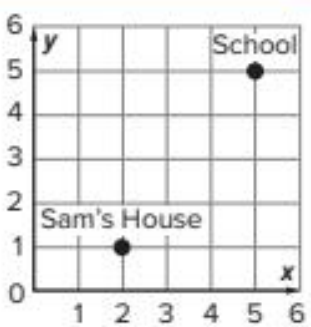


Math is... Choosing Tools

How many units right and up do you go to get from Sam's House to School?

Work Together

What steps would you take to plot the points for the Park and Jeremy's House?



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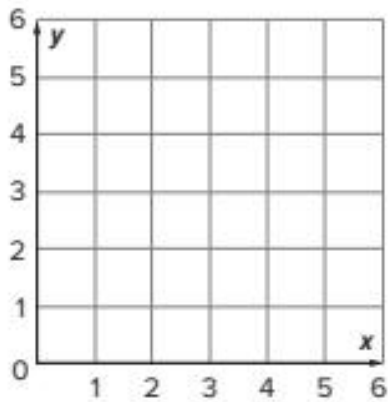
On My Own

Name _____

Plot and label the point for each place shown in the table.

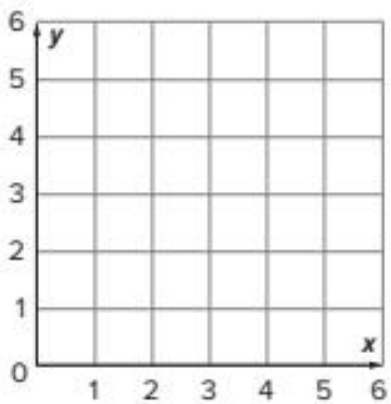
Place	Ordered Pair
Playground	(4, 6)
Post Office	(1, 2)
Fire Station	(5, 3)
Jill's House	(2, 4)

1. Playground
2. Post Offi
3. Fire Station
4. Jill's House



Plot and label the point for each ordered pair.

5. $M(3, 2)$
6. $N(4, 3)$
7. $P(5, 4)$
8. $Q(1, 5)$



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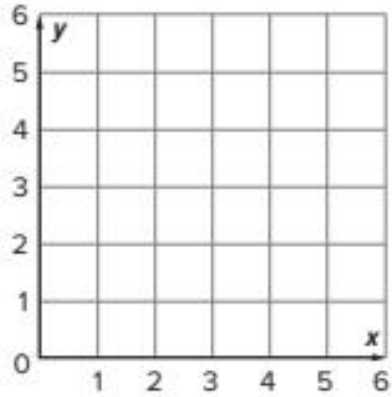
Plot and label the point for each ordered pair.

9. $R(0, 0)$

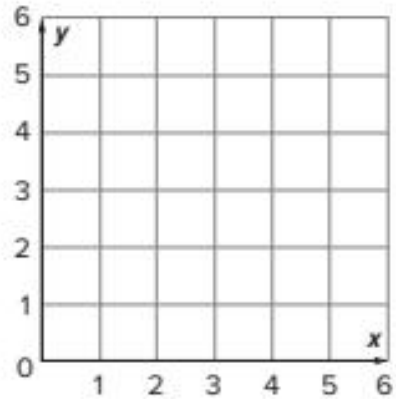
10. $S(4, 0)$

11. $T(0, 6)$

12. $U(3, 5)$



13. Extend Your Thinking Plot the points (1, 3), (1, 6), (5, 6), and (5, 3). Draw a line to connect the points in the order in which you plotted them. What is the length and width of the shape?



Reflect

How can you plot points on the coordinate plane when given an ordered pair?

Math is... Mindset

How has being flexible in your thinking helped you make good decisions?

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Lesson 13-3

Represent Problems on a Coordinate Plane

Be Curious

What questions could you ask?

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Math is... Mindset

What strategies help you work more efficiently?

Learn

Aliyah is at the 30th floor of a building. While waiting for the elevator, she collected the data shown in the table.

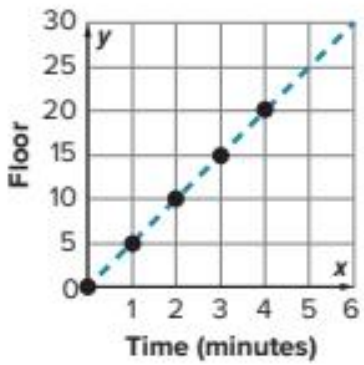
Time (min)	Floor
0	0
1	5
2	10
3	15
4	20

How many minutes will it take the elevator to reach Aliyah's floor?

You can write the times and corresponding location of the elevator as ordered pairs.

Ordered Pair
(0, 0)
(1, 5)
(2, 10)
(3, 15)
(4, 20)

Then, plot the ordered pairs on the coordinate plane. Draw a line to show the pattern.



It will take 6 minutes for the elevator to reach Aliyah's floor.

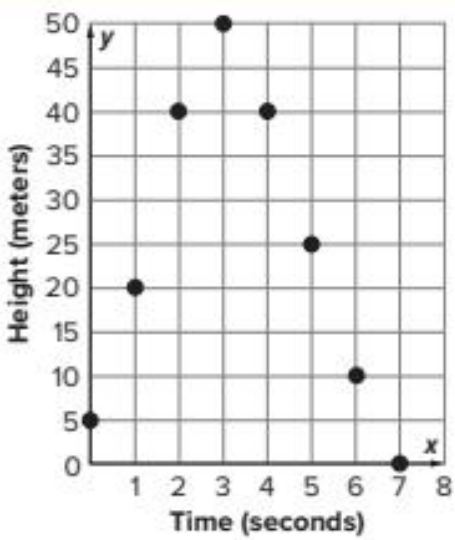
Math is... Modeling

How does plotting points on the coordinate plane help you understand data?

You can interpret points on the coordinate plane.

Work Together

This graph represents the beginning of a rollercoaster ride. What do you think happened between 2 seconds and 4 seconds?



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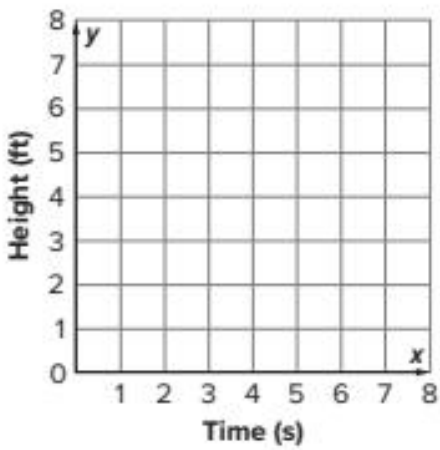
On My Own

Name _____

1. The table shows the time it took for a fifth-grade student to go down the slid at a park and their height from the ground while going down the slide. Write the time and corresponding heights as ordered pairs.

Time (seconds)	Height (feet)
0	7
1	5
2	4
3	3
4	2
5	1

2. Plot and connect the points on a coordinate plane.



3. How tall is the slide?

4. How long does it take for the student to go down the slide?

5. What happens between 0 seconds and 1 second?

6. Where is the student after 5 seconds?

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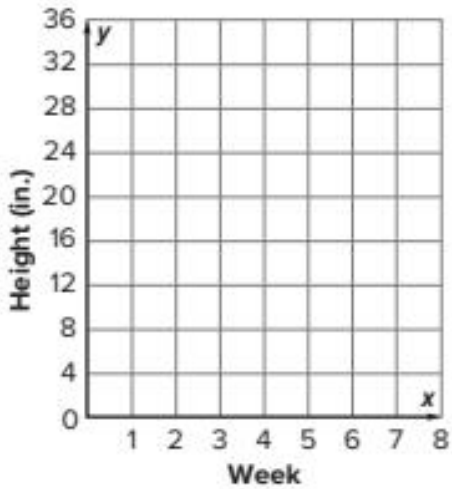
7. **STEM Connection** Poppy measures the height of a plant over several weeks and records it in the table. The plant is 14 inches tall before she begins recording. Write the weeks and corresponding heights as ordered pairs.

Week	Height (inches)
1	16
2	20
3	22
4	22
5	28
6	32

8. Plot and connect the points on the coordinate plane.



9. How much does the plant grow between Weeks 1 and 2?

10. What happens between Weeks 3 and 4?

11. How much does the plant grow between before Poppy begins recording and Week 6?

12. **Extend Your Thinking** What are some real-world situations you could interpret from points represented on a coordinate plane?

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Reflect

How are data presented on a coordinate plane helpful for understanding real-world situations?

Math is... Mindset

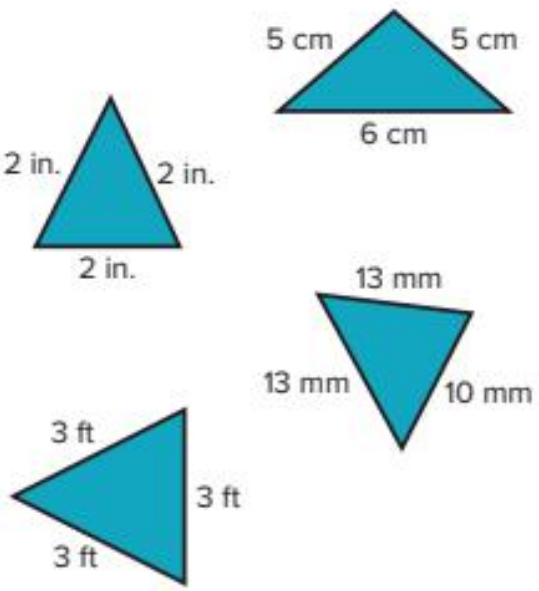
What strategies helped you work more efficiently?

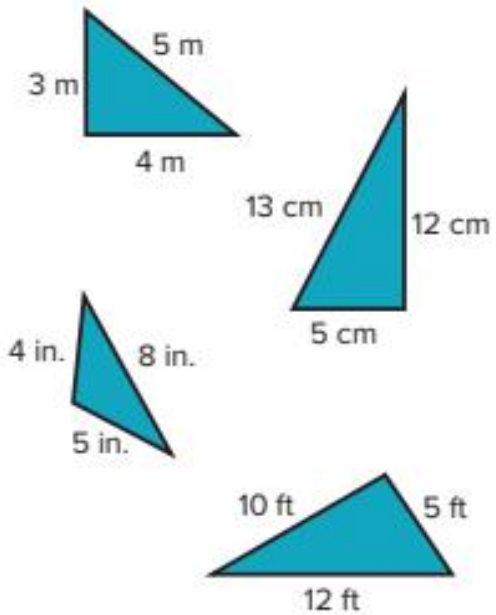
Classify Triangles by Properties

Be Curious

What could the question be?

Examples	Non-Examples





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Math is... Mindset

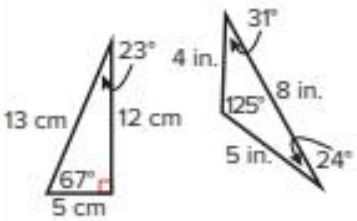
How do your skills or interests help you with your work?

Learn

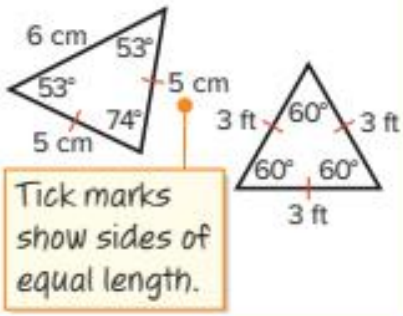
What are some ways you can classify triangles?

You can sort the triangles into **categories** based on their **properties**.

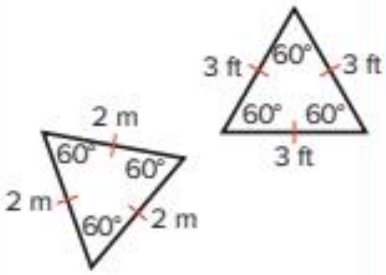
Scalene triangles have no sides of equal length.



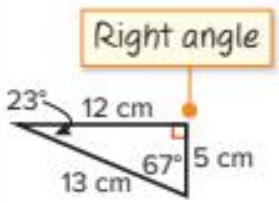
Isosceles triangles have at least two sides of equal length.



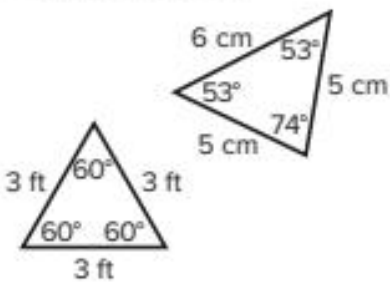
Equilateral triangles have 3 sides of equal length.



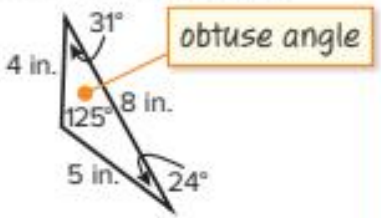
Right triangles have one right angle.



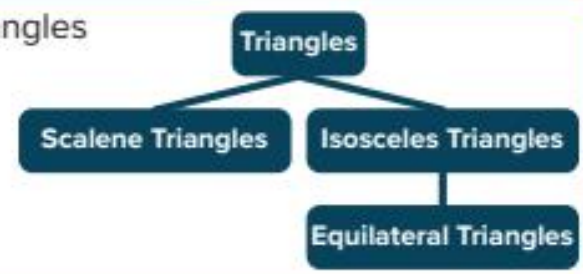
Acute triangles have 3 acute angles.



Obtuse triangles have one obtuse angle.



You can represent the categories of triangles as a **hierarchy** with **subcategories**.



Math is... Explaining

Why is an equilateral triangle also an isosceles triangle?

Work Together

Are the following statements *always true*, *sometimes true*, or *never true*? Explain.

An acute triangle is an equilateral triangle.

An isosceles right triangle is an isosceles triangle.

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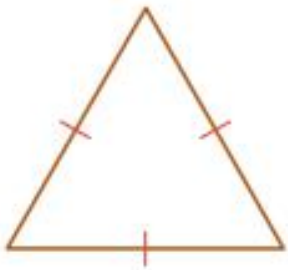
On My Own

Name _____

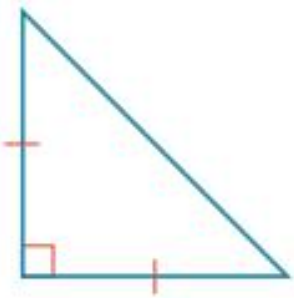
Classify each triangle by using their properties.

1.

2.

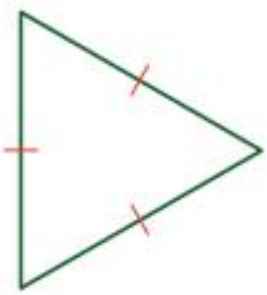


3.

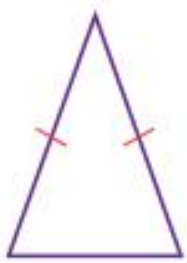


4.

5.



6.



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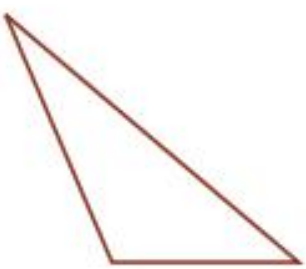
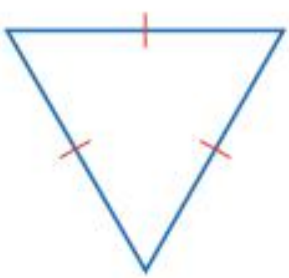


8.



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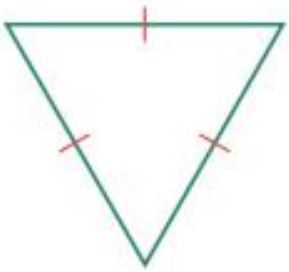
9. What is a property of all triangles?

10. What is a property of scalene triangles?

11. What is a property of isosceles triangles?

12. What is a property of equilateral triangles?

13. **Error Analysis** Tina categorizes this triangle as an equilateral triangle and says it cannot be categorized as an isosceles triangle. How can you help Tina correct her thinking?



14. **Extend Your Thinking** Draw examples of an isosceles triangle, an equilateral triangle, and a scalene triangle. Use tick marks to show sides of the same length.

Reflect

How can knowing the properties of triangles be helpful when classifying triangles?

Math is... Mindset

How did your skills or interests help you with your work today?

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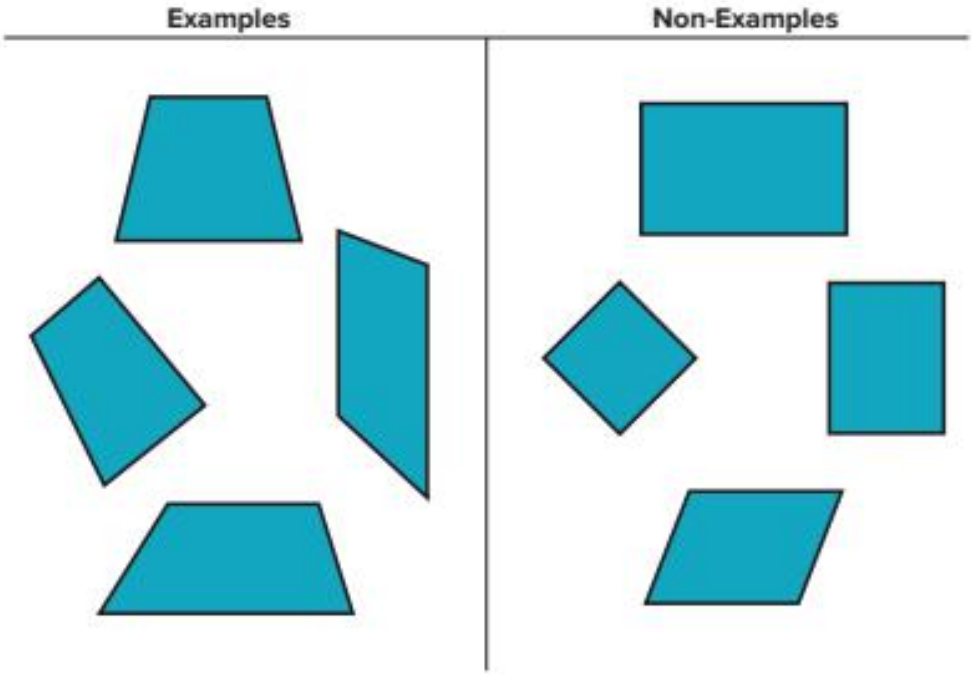
Properties of Quadrilaterals

Be Curious

What could the question be?



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Math is... Mindset

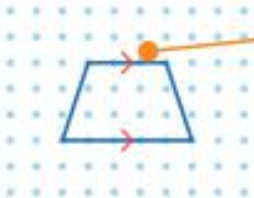
How do you show that you understand your partner's point of view?

Learn

How many different kinds of quadrilaterals can you make with line segment *AB* as one of the sides?

You can identify quadrilaterals by their properties.

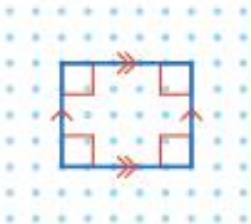
A trapezoid is a quadrilateral with exactly one pair of parallel sides.



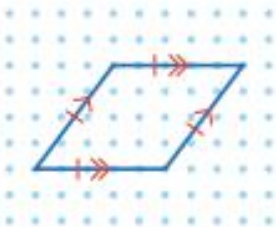
This mark shows this side is parallel to the other side having the same mark.

A parallelogram is a quadrilateral with two pairs of parallel sides.

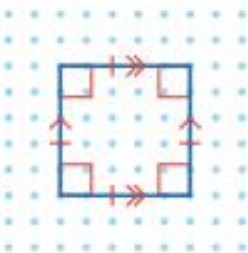
A rectangle is a parallelogram with four right angles.



A rhombus is a parallelogram with four sides of equal length.



A square is a parallelogram with four sides of equal length and four right angles.



You can make 5 different kinds of quadrilaterals.

Math is... Structure

How can you compare the properties of quadrilaterals and triangles?

Work Together

What are the properties of a square?

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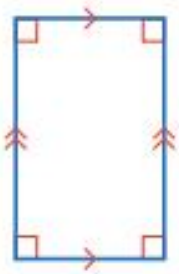
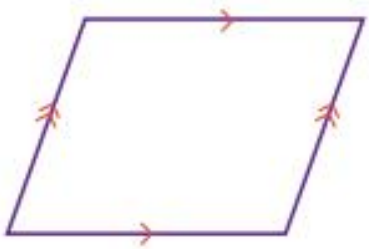
On My Own

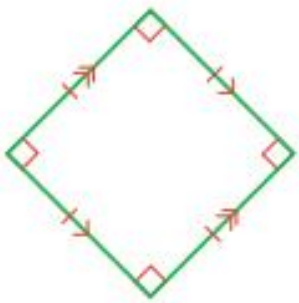
Name _____

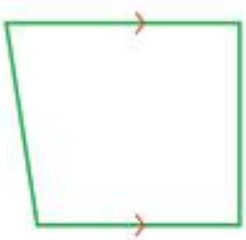
Classify each figure by using their properties.

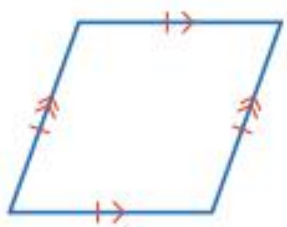
1. 

2.

3. 

4. 

5. 

6. 

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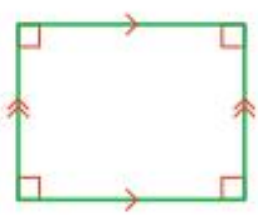
8. 

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9. **STEM Connection** Sam is drawing a picture of a house he sees. One of the front windows has 2 sets of parallel sides, 4 right angles, and 2 sides of different lengths. What is the shape of the window ?

10. How is a square different from a rhombu ?

11. How is a parallelogram different from a rhombu ?

12. What are the properties of a trapezoid?

13. **Extend Your Thinking** How are all quadrilaterals the same? How are they different

Reflect

How can knowing the properties of quadrilaterals help you identify quadrilaterals?

Math is... Mindset

How did you show that you understand your partner's point of view?

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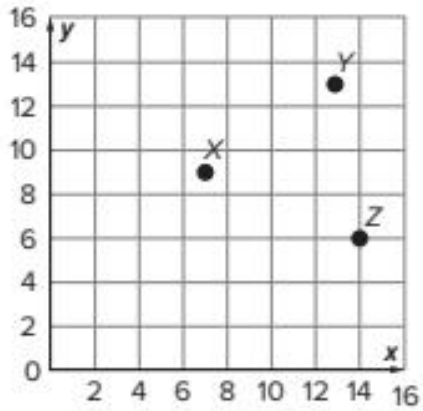
Unit 13

Ordered Pairs

Name _____



Circle the ordered pair that names the given point.

1. Point *X*

a. (9, 7)
b. (7, 9)
c. (6, 7)
d. (10, 8)
e. None of the above

2. Point *Y*

a. (9, 9)
b. (9, 10)
c. (13, 13)
d. (10, 10)
e. None of the above

3. Point *Z*

a. (14, 6)
b. (9, 5)
c. (6, 14)
d. (5, 9)
e. None of the above

Explain how you determined the ordered pairs in exercises 1–3.

4. Point *X*

5. Point *Y*

6. Point *Z*

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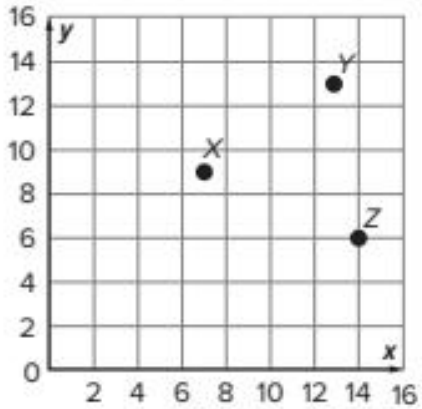

7. Which ordered pair, if plotted on the graph above, would create the fourth vertex of a parallelogram?

Circle the ordered pair that completes the parallelogram.

a. (6, 2)

b. (2, 8)

c. (8, 2)

d. (12, 2)

e. None of the above

Explain or show how you know.

Reflect On Your Learning

I'm confused. | I'm still learning. | I understand. | I can teach someone else.

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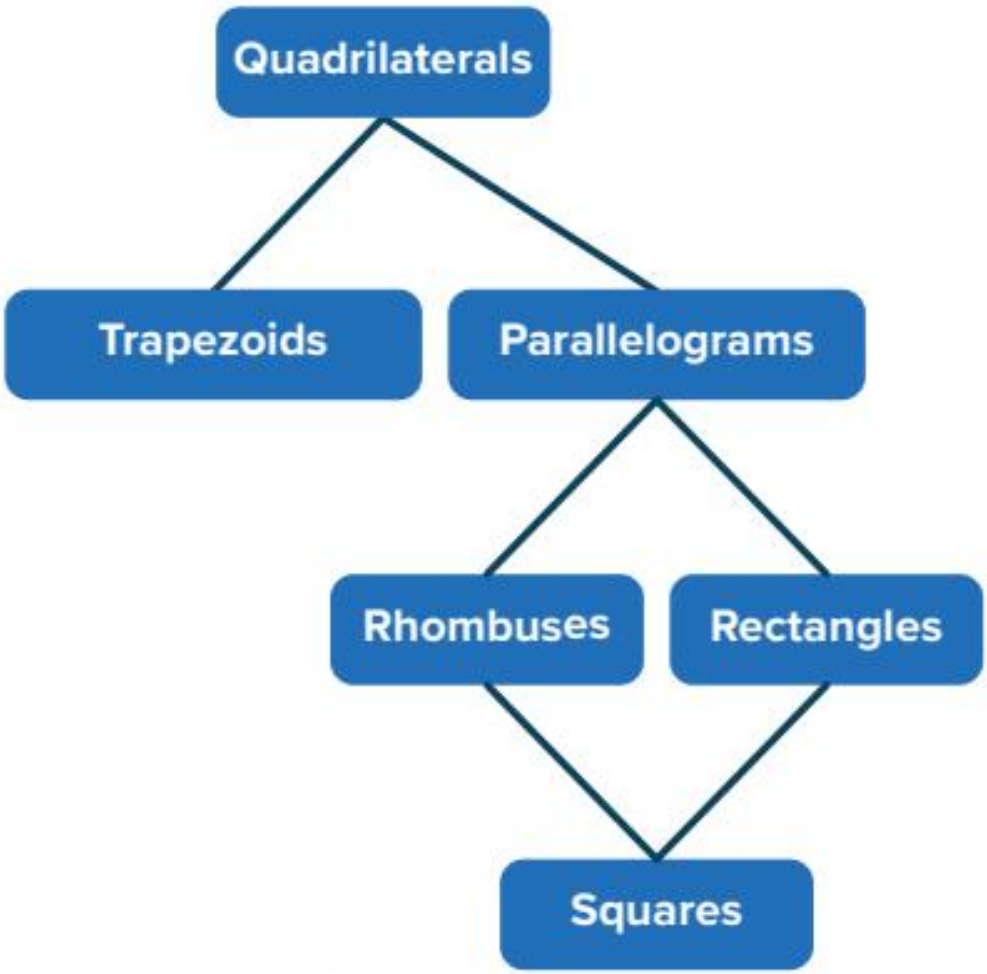
Lesson 13-6

Classify Quadrilaterals by Properties

Be Curious

What do you notice?
What do you wonder?



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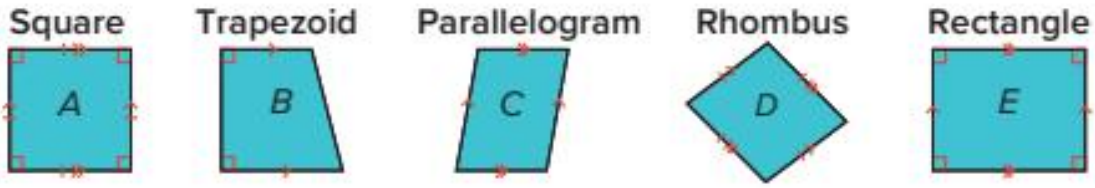
Math is... Mindset

What helps you know that you have made good decisions?

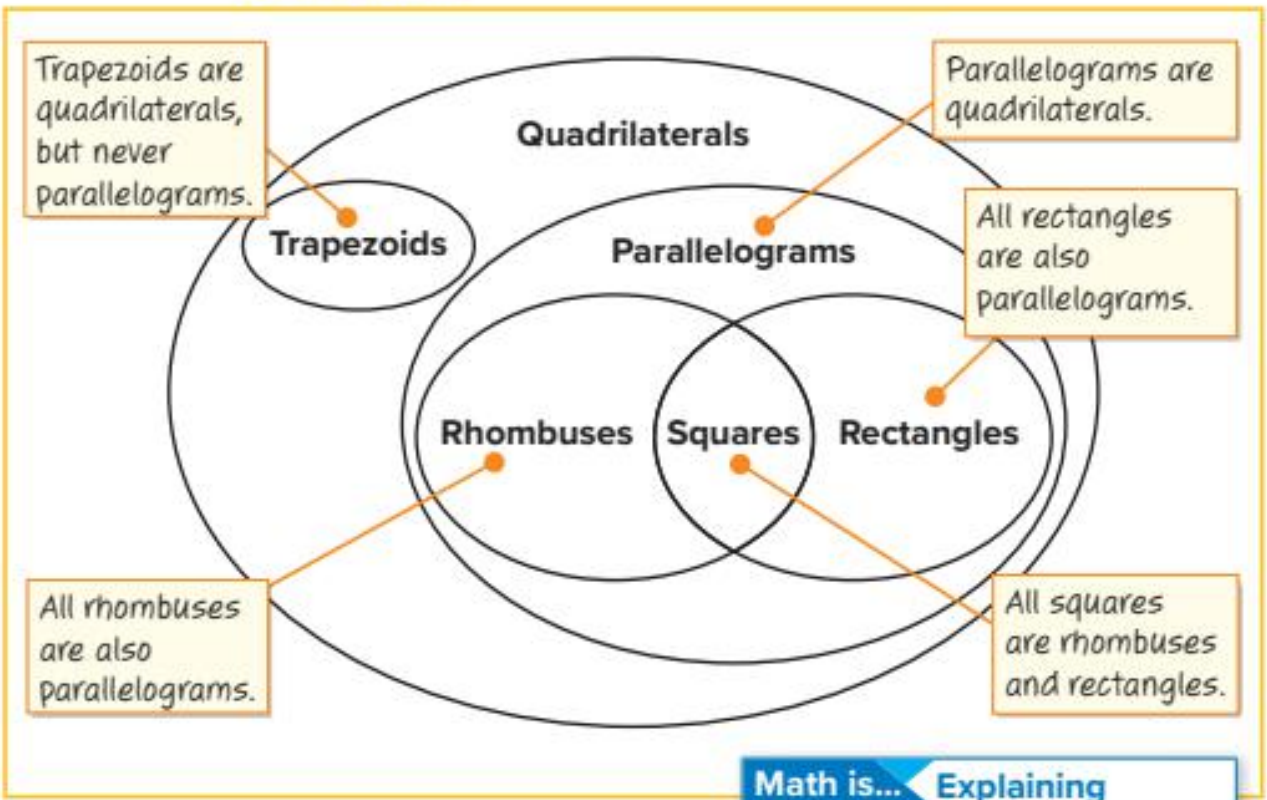
Learn

How can you represent the different categories and subcategories of quadrilaterals?



Quadrilaterals can be classified into categories and subcategories based on their shared properties.

You can use a **Venn diagram** to show a hierarchy.



Math is... Explaining

How does the Venn diagram show the relationship among quadrilaterals?

Work Together

Are the following statements *always true*, *sometimes true*, or *never true*?

A trapezoid is a parallelogram.

A square is a rhombus.

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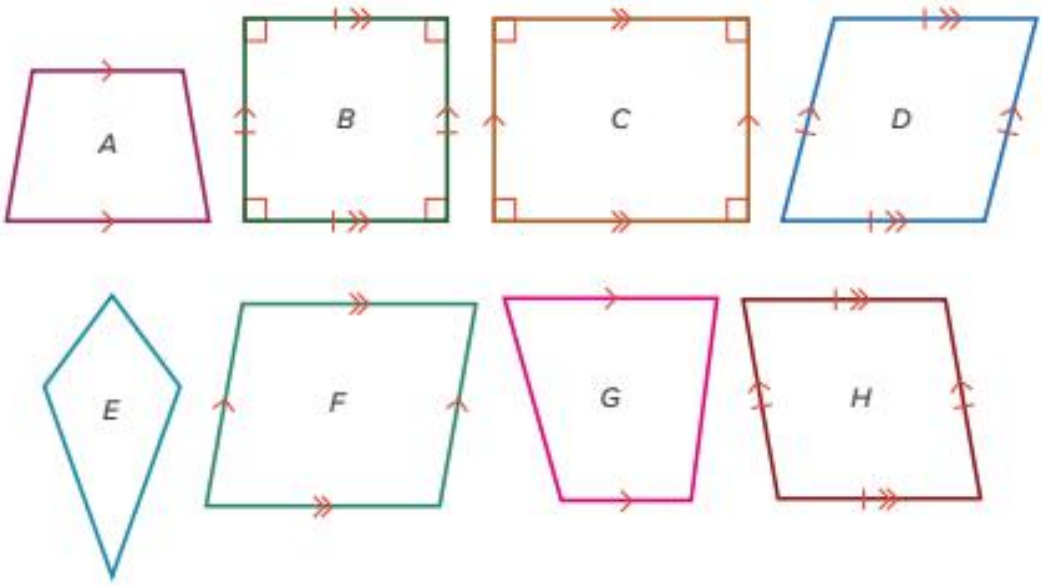
On My Own

Name _____

Use the figures for Exercises 1–8. Identify the figures that could be classified into each subcategory.



1. quadrilaterals
2. trapezoids
3. parallelograms
4. rectangles
5. rhombuses
6. squares
7. How did you know how to classify each shape? Explain.

8. Did you classify any shapes into more than one category? If so, explain why.

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9. **STEM Connection** Hanna is helping cut some sheets of metal. She needs to cut them so that they have 4 sides with two pairs of parallel sides. Some need to have 4 right angles and some do not. How can she classify the sheets of metal?

10. Which quadrilaterals always have 4 right angles?

11. Which quadrilaterals always have exactly 1 pair of parallel sides?

12. Which quadrilaterals always have 4 sides of equal length?

13. **Extend Your Thinking** Why can a rectangle also be called a parallelogram?

Reflect

How can knowing the hierarchy of quadrilaterals help you describe their properties?

Math is... Mindset

How did you know that you made good decisions?

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Unit Review Name _____

Vocabulary Review

Choose the correct word(s) to complete each sentence.

coordinate plane	parallelogram	subcategory	*x*-axis
ordered pair	square	trapezoid	*y*-axis
origin			

1. A _____ is a rectangle with four sides of equal length. (Lesson 13-5)

2. The _____ (2, 7) names the *x*-coordinate and *y*-coordinate of a point on the coordinate plane. (Lesson 13-1)

3. A _____ is a quadrilateral with exactly one pair of parallel sides. (Lesson 13-5)

4. The _____ is the horizontal number line on the coordinate plane. (Lesson 13-1)

5. The ordered pair (0, 0) represents the _____ of the coordinate plane. (Lesson 13-1)

6. A _____ is a subset of shapes of a category that share a certain property. (Lesson 13-4)

7. The _____ is the vertical number line on the coordinate plane. (Lesson 13-1)

8. The _____ is formed by a horizontal number line and a vertical number line intersecting and forming a right angle. (Lesson 13-1)

9. A _____ is a quadrilateral with two pairs of parallel sides. (Lesson 13-5)

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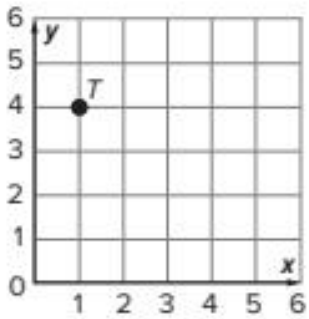
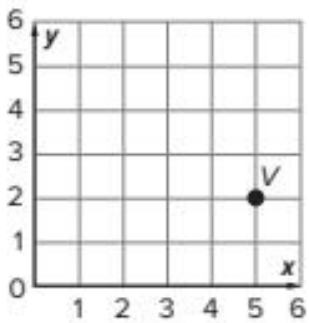
Review

10. What ordered pair represents point *T*? (Lesson 13-1)



11. What ordered pair represents point *V*? (Lesson 13-1)



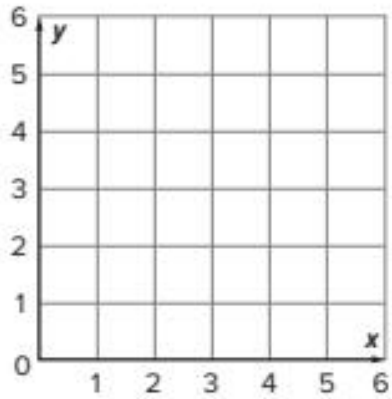
12. What ordered pair represents the origin? (Lesson 13-1)

13. Which axis is used to find the *x*-coordinate? (Lesson 13-1)

14. Which axis is used to find the *y*-coordinate? (Lesson 13-1)

15. Plot each location on the coordinate plane. (Lesson 13-2)

Feature	Ordered Pair
Start of Trail	(0, 4)
Canoe Rental	(3, 2)
Stage	(4, 5)
Picnic Area	(4, 3)



16. What are the steps in plotting the point (3, 10) on the coordinate plane? (Lesson 13-2)

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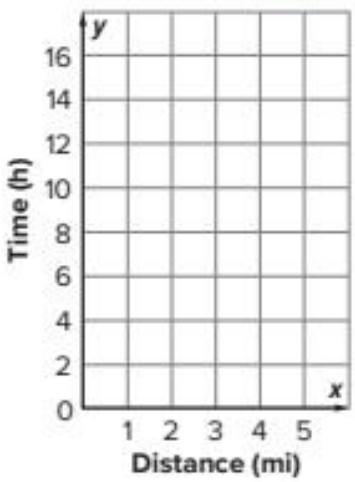
17. The table shows how far in miles Madison is from home at the beginning of each hour of her bike trip.

Time (hours)	Distance from Home (miles)
0	0
1	8
2	16
3	16
4	8
5	0

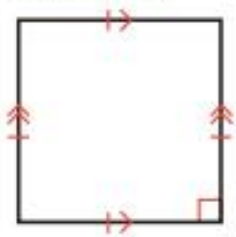
a. Where do the points for each distance Madison is from home belong on the coordinate plane? (Lesson 13-3)



b. What do you think Madison did between hour 2 and hour 3 of her bike trip? (Lesson 13-3)

18. What property of triangles is used to classify scalene, isosceles, and equilateral triangles? How do you know? (Lesson 13-4)

19. Select all the possible names for this figur . (Lesson 13-6)



A. parallelogram

B. rectangle

C. square

D. rhombus

E. trapezoid

20. Is a square always a rhombus? Is a rhombus always a square? How do you know? (Lesson 13-6)

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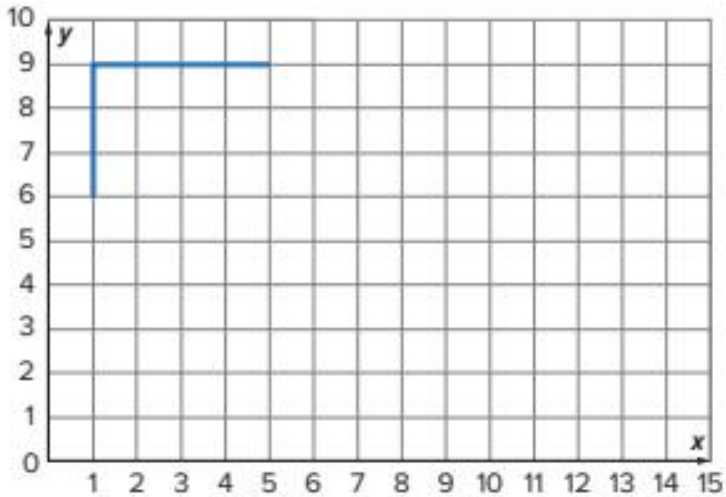
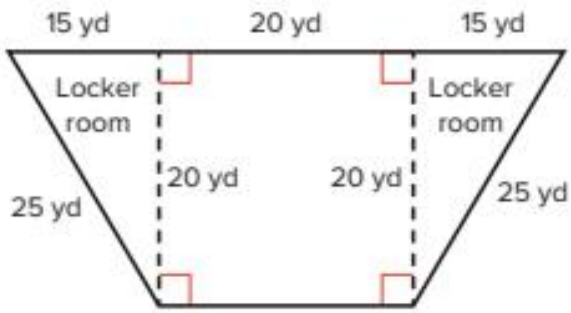
Performance Task

An architect is designing a new athletic center that includes both buildings and fields.

Part A: The architect started to draw a sketch of the soccer field. The length is 12 units, and the width is 8 units. What are the coordinates of the four corners of the soccer field?



Part B: The indoor gym.



What are all of the names that describe the area that is **not** part of the locker rooms? How do you know?

Reflect

How can I use a hierarchy diagram to understand the properties of shapes?

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Unit 13

Fluency Practice

Name _____

Fluency Strategy

You can choose any strategy to multiply. You can use an area model, partial products, or a strategy.

Area model

Decompose each factor by place value.

126 × 34

	100	+ 20	+ 6
30	3,000	600	180
+			
4	400	80	24

Add the partial products.

3,000 + 600 + 180 + 400 + 80 + 24 = 4,284

Fluency Flash

Complete the area model. Then solve.

1. 489 × 7 = _____

	400	+ 80	+ 9
7			

2. 23 × 67 = _____

	60	+ 7
20		
+		
3		

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Fluency Check

What is the product?

3. $\begin{array}{r} 345 \\ \times \quad 19 \\ \hline \end{array}$

4. $\begin{array}{r} 439 \\ \times \quad 76 \\ \hline \end{array}$

5. 28 × 76 = _____

6. 364 × 5 = _____

7. 75 × 86 = _____

8. $\begin{array}{r} 257 \\ \times \quad 32 \\ \hline \end{array}$

9. $\begin{array}{r} 147 \\ \times \quad 28 \\ \hline \end{array}$

10. 59 × 48 = _____

11. 99 × 4 = _____

12. 284 × 63 = _____

Fluency Talk

When using an area model, how is multiplying a 2-digit number by a 1-digit number different than multiplying a 2-digit number by a 2-digit number?

When would you choose to use a strategy instead of an area model?

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Unit 14

Algebraic Thinking

Focus Question

How can I begin to think about algebra?

Hi, I'm Malik.

I want to be a photonics engineer. Photonics engineers work with some lasers that can't be seen by our eyes. They use a grid to track the path of the lasers. I will need to be able to look for patterns on a grid.

STEM video | GO ONLINE

IGNITE!

Name _____

5–4–3–2–1 Challenge

Use each of the numbers 5, 4, 3, 2, and 1—and any of the operations—to obtain the numbers 1–10. When necessary, use rings or some other method to clarify the numbers on which an operation is to be performed.

1 = 5 − 4 + 3 − 2 − 1

2 = 5 + 4 − (3 × 2) − 1

3 = 5 4 3 2 1

4 = 5 4 3 2 1

5 = 5 4 3 2 1

6 = 5 4 3 2 1

7 = 5 4 3 2 1

8 = 5 4 3 2 1

9 = 5 4 3 2 1

10 = 5 4 3 2 1

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Lesson 14-1

Write Numerical Expressions

Be Curious

What math do you see in this problem?

The school secretary will order some boxes of highlighters.

The boxes will have some yellow and some pink highlighters.

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Math is... Mindset

Why is it important to speak clearly and concisely?

Learn

The school secretary will order 9 boxes of highlighters.

How can you show the number of yellow and pink highlighters that will be in the order?

The **numerical expression** 9×6 shows the number of yellow highlighters that will be in the order.

$$9 \times 6$$

Boxes ordered

Yellow highlighters in each box

The numerical expression 9×3 shows the number of pink highlighters that will be in the order.

$$9 \times 3$$

Boxes ordered

Pink highlighters in each box

This numerical expression shows the number of yellow and pink highlighters that will be in the order.

$$(9 \times 6) + (9 \times 3)$$

Math is... Precision

How is an equation similar to an expression? How is it different?

You can use numbers—operation symbols, such as +, −, ×, and ÷—and grouping symbols, such as parentheses, to write numerical expressions.

Work Together

What numerical expressions represent the description?
Add 35 and 72. Then multiply by 12.

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On My Own

Name _____

What numerical expression represents the description?

1. Divide 40 by 5. Then, subtract 2.

2. Multiply 4 and 8. Then, add 7.

3. Add $2\frac{1}{2}$ and $4\frac{2}{3}$. Then, subtract $\frac{1}{8}$.

4. Add 4.8 and 5.6. Then, subtract the sum from 16.9.

5. Subtract $4\frac{1}{4}$ from $10\frac{2}{5}$. Then, divide by 3.

6. Subtract 8 from 32. Then, divide 48 by the differenc .

7. Add 6.7 and 8.25. Then, multiply by 11.2.

8. Divide 24 by 6. Multiply 5 and 7. Then, add the quotient and the product.

9. **Error Analysis** Christine is planting 48 marigolds. She will plant 12 of the flowers in pots and the rest in rows of 4 plants each. She wrote this numerical expression to represent the number of plants in each row.

   $48 - (12 \div 4)$

   How do you respond to Christine?

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10. The school cafeteria is making snack packs. Each pack will have the number of carrot sticks and celery sticks shown. What numerical expression represents how many carrot sticks and celery sticks are needed to make 25 snack packs?

11. The principal is making 50 new student packets. Each packet contains 12 pencils and 5 pens. What numerical expression represents how many pencils and pens the principal needs to make the packets?

12. Katie makes 49 cookies. She gives 4 to her sister and then divides the cookies up equally to give to her 9 friends. What numerical expression represents how many cookies each of her friends will get?

13. **Extend Your Thinking** Write your own description and numerical expression.

Reflect

How did you think like a mathematician while writing numerical expressions?

Math is... Mindset

How did speaking clearly and concisely help you share your ideas?

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Interpret Numerical Expressions

Be Curious

How are they the same?
How are they different?

$$3 \times (45.8 + 32.6)$$

$$(3 \times 45.8) + (3 \times 32.6)$$

$$(45.8 + 32.6) \times 3$$

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Math is... Mindset

How do you show you understand how others are feeling?

Learn

How are these numerical expressions the same? How are they different?

$(10 \times 18) + 4$

$10 \times (18 + 4)$

Both expressions have the same numbers. 10, 18, and 4.

Both expressions use multiplication and addition.

Both expressions have parentheses.

$(10 \times 18) + 4$

$10 \times (18 + 4)$

The expressions are different in how the numbers are grouped.

This expression is the sum of 4 and the product of 10 and 18. $(10 \times 18) + 4$ $\downarrow$ $180 \quad + 4$	This expression is the product of 10 and the sum of 18 and 4. $10 \times (18 + 4)$ $\downarrow$ 10×22

You can understand numerical expressions by interpreting them.

Math is... Structure

How does looking at the parts of a numerical expression help you interpret it?

Work Together

Interpret the numerical expressions.

Compare the expressions using >, <, or =. Explain your reasoning.

$(1{,}525 + 1{,}583) \div 12 \bigcirc 1{,}525 + 1{,}583$

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On My Own

Name _____

Write the description for each numerical expression.

1. $(9 \times 18) - 5$

2. $9 \times (18 - 5)$

3. $80 \div (20 \times 4)$

4. $(80 \div 20) \times 4$

Compare the expressions using >, <, or =. Explain your reasoning.

5. $120 \div 12$ ◯ $(120 \div 12) - 9$

6. 50.5×7.2 ◯ $(50.5 - 4.8) \times 7.2$

7. $5\frac{3}{4} \times (2\frac{1}{8} + 3\frac{1}{2})$ ◯ $(5\frac{3}{4} \times 2\frac{1}{8}) + (5\frac{3}{4} \times 3\frac{1}{2})$

8. A store ordered 4,500 T-shirts and 4,500 sunglasses. Without doing any calculations, which costs more? Explain your reasoning.

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Determine whether Expression A is 5 times as much as Expression B. Place a checkmark in the *Yes* or *No* column.

	Expression A	Expression B	Yes	No
9.	$5 \times (1\frac{1}{4} \times 4\frac{5}{8})$	$1\frac{1}{4} \times 4\frac{5}{8}$		
10.	$(5 \times 4.39) + (5 \times 8.99)$	$4.39 + 8.99$		
11.	$(65 \times 5) \times 2$	$(65 \times 2) \times 5$		
12.	$(3{,}492 - 2{,}482) \times 5$	$3{,}492 - 2{,}482$		
13.	$(895 + 345) \div 5$	$895 + 345$		
14.	$6.71 \times (3.28 \times 5.16)$	6.71×3.28		

15. Extend Your Thinking Write a word problem that could be represented by each numerical expression:

$8 \times (4 + 2)$ $\qquad$ $(8 \times 4) + 2$

Explain why the way the expressions are grouped impacts what happens in the word problem.

Reflect

How can you interpret numerical expressions without evaluating them?

Math is... Mindset

How did you show you understand how others are feeling?

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Lesson 14-3

Evaluate Numerical Expressions

Be Curious

What do you see?

Math is... Mindset

What helps you get started on your work?

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Learn

Two students evaluated $6 + (3 \times 8) \div 4$.

What might explain why their answers are different?

When you evaluate expressions, you need to follow certain steps.

Step 1 Evaluate any expressions inside grouping symbols, like parentheses.

$$6 + (3 \times 8) \div 4$$
$$\downarrow$$
$$6 + 24 \div 4$$

Step 2 Perform any multiplication or division in order from left to right.

$$6 + 24 \div 4$$
$$\downarrow$$
$$6 + 6$$

Step 3 Perform any addition or subtraction in order from left to right.

$$6 + 6 = 12$$

One student did not follow order of operations.

When you evaluate numerical expressions, you need to perform operations in a specific order, called order of operations.

Math is... Structure

How does the order of operations help you evaluate expressions?

Work Together

Is the evaluation of $10 \times 3 + 2$ the same as the evaluation of $(10 \times 3) + 2$? Explain.

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On My Own

Name _____

Which operation will you perform first to evaluate the expression? Explain your reasoning.

1. $25 - 5 \times (4 - 3)$

2. $37 + 8 \div 2 - 5$

3. $\frac{3}{4} \times (2\frac{1}{2} + 6\frac{1}{4})$

4. $100 \times 4 + 6 - 10$

What is the solution? Show your work.

5. $3 + 7 \times 2 =$ ____

6. $(3 + 7) \times 2 =$ ____

7. $56 \div 8 - 3 + 2 \times 5 =$ ____

8. $56 \div (8 - 3 + 2) \times 5 =$ ____

9. $2\frac{3}{8} + 1\frac{1}{4} \times 6\frac{3}{4} - \frac{1}{2} =$ _____

10. $5.8 \times (6.75 + 3.25) \div 2 =$ _____

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11. Which numerical expression is equal to 8?

A. $24 \div 6 \times 4 + 7$

B. $(24 \div 6) \times 4 + 7$

C. $24 \div (6 \times 4) + 7$

D. $24 \div 6 \times (4 + 7)$

12. Which numerical expression is equal to 1?

A. $96 \div 12 \times 4 \div 2$

B. $96 \div (12 \times 4) \div 2$

C. $96 \div (12 \times 4 \div 2)$

D. $96 \div 12 \times (4 \div 2)$

13. Error Analysis Brenna evaluated this expression. How can you help Brenna correct her thinking?

$36 \div 2 \times 9 \div 3 = \frac{2}{3}$

14. Extend Your Thinking Evaluate the expression. Then, explain how the use of grouping symbols could change the expression and how you evaluate it.

$6 \div 2 + 9 \div 3$

Reflect

Why is following the order of operations important when evaluating numerical expressions?

Math is... Mindset

What helped you get started on your work?

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Unit 14

Order of Operations

Name _____

For each problem, determine which operation should be evaluated first. Do not perform the exact evaluation.

1. $4 + 3 \times 9 - 1$

Which expression should be evaluated first

a. $4 + 3$

b. 3×9

c. $9 - 1$

d. Doesn't matter which expression is evaluated first

Explain or show your thinking.

2. $24 \div 6 \times 2 + 4$

Which expression should be evaluated first

a. $24 \div 6$

b. 6×2

c. $2 + 4$

d. Doesn't matter which is done first

Explain or show your thinking.

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For each problem, determine which operation should be evaluated first. Do not perform the exact evaluation.

3. $8 + 3 \times (4 - 1)$

Which expression should be evaluated first

a. $8 + 3$

b. 3×4

c. $4 - 1$

d. Doesn't matter which is evaluated first

Explain or show your thinking.

4. $6 \div (3 + 3) \times 4$

Which expression should be evaluated first

a. $6 \div 3$

b. $3 + 3$

c. 3×4

d. Doesn't matter which is evaluated first

Explain or show your thinking.

Reflect On Your Learning

I'm confused. | I'm still learning. | I understand. | I can teach someone else.

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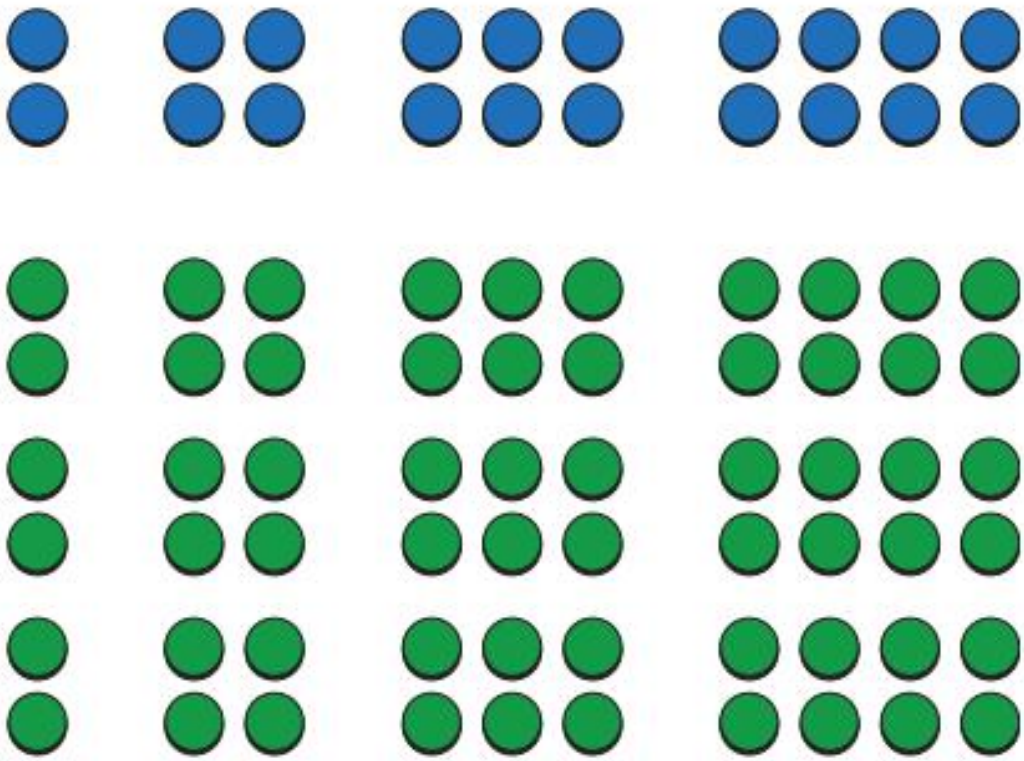
Numerical Patterns

Be Curious

What questions can you ask?



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Math is... Mindset

What are your strengths in math?

Learn

Alex and Jenna participate in a sit-up challenge. They both do 0 sit-ups on the first day. Each day after the first day, Alex adds 2 sit-ups to the number she did the previous day and Jenna adds 6 sit-ups to the number she did the previous day.

How many sit-ups will Jenna do on the day that Alex does 20 sit-ups?

You can use **numerical patterns** to help you solve the problem.

Each day, Alex does 2 sit-ups more than the day before.

0, 2, 4, 6, 8, 10, ...

The rule is add 2.

Each day, Jenna does 6 sit-ups more than the day before.

0, 6, 12, 18, 24, 30, ...

The rule is add 6.

Each day is a term in the pattern. The matching terms are **corresponding terms**.

corresponding terms

term

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	
Alex	0	2	4	6	8	10	× 3
Jenna	0	6	12	18	24	30	

The number of sit-ups Jenna does is always 3 times the number of sit-up Alex does.

Use the relationship to solve the problem.

$20 \times 3 = 60$

Jenna does 60 sit-ups on the day that Alex does 20.

Math is... Connections

How is this relationship connected to the rules for Alex's and Jenna's numeric patterns?

You can identify a relationship between corresponding terms in two numerical patterns.

Work Together

On the day that Jenna did 54 sit-ups in a day, how many sit-ups did Alex do?

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On My Own

Name _____

Use the information given for Exercises 1–8.

Quentin and Tyler are running laps on the school track. Each time they complete a lap, they do jumping jacks.

They both do 0 jumping jacks after the first la .

Each lap, Quentin adds 1 jumping jack to the number of jumping jacks he did after the lap before.

Each lap, Tyler adds 4 jumping jacks to the number of jumping jacks he did after the lap before.

1. What is the rule for Quentin's numerical pattern?

2. What is the rule for Tyler's numerical pattern?

3. Write the first 5 terms of Quenti 's numerical pattern.

4. Write the first 5 terms of yler's numerical pattern.

5. When Quentin does 4 jumping jacks after a lap, how many jumping jacks will Tyler do after that same lap?

6. What is a relationship between corresponding terms in the two numerical patterns?

7. How many jumping jacks will Tyler do after the lap when Quentin does 8 jumping jacks?

8. How many jumping jacks will Quentin do after the lap when Tyler does 40 jumping jacks?

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Use Numerical Patterns A and B for Exercises 9–12.

Numerical Pattern A: 0, 2, 4, 6, 8, 10, 12

Numerical Pattern B: 0, 6, 12, 18, 24, 30, 36

9. What is the rule for Pattern A?

10. What is the rule for Pattern B?

11. What is a relationship between the corresponding terms in the two numerical patterns?

12. When the number in Pattern A is 28, what will be the number in Pattern B?

13. **Extend Your Thinking** Write two numerical patterns where a relationship between the corresponding terms is to multiply by 6. Start at 0 and write the first five terms for each numerica pattern and the rule for each numerical pattern.

Reflect

How can you explain the relationships between numerical patterns?

Math is... Mindset

How have you used your strengths today? What can you work to improve?

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Lesson 14-5

Relate Numerical Patterns

Be Curious

What do you notice?
What do you wonder?

Pattern A: 0, 2, 4, 6, 8, 10, ...

Pattern B: 0, 8, 16, 24, 32, 40, ...

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Math is... Mindset

How do you show others you respect their ideas?

Learn

Pattern A starts at 0 and adds 1 to each term.

Pattern B starts at 0 and adds 5 to each term.

How can you determine a relationship between corresponding terms of these numerical patterns?

You can use a table to identify a relationship between the patterns.

Pattern A + 1	Pattern B + 5
0	0
1	5
2	10
3	15
4	20

Each term in Pattern B is 5 times as much as its corresponding term in Pattern A. You can use this relationship to determine unknown terms.

Math is... Structure

How are the terms in Pattern A related to their corresponding terms in Pattern B?

If 10 is a term in Pattern A, what is its corresponding term in Pattern B?

$10 \times 5 = t$

$t = 50$

If 70 is a term in Pattern B, what is its corresponding term in Pattern A?

$c \times 5 = 70$

$c = 14$

You can organize numerical patterns in a table to help you identify and describe relationships between corresponding terms.

Work Together

How can you determine a relationship between corresponding terms of these two numerical patterns?

Pattern A starts at 0 and adds 3 to each term.

Pattern B starts at 0 and adds 6 to each term.

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On My Own

Name _____

Describe a relationship between corresponding terms in Patterns A and B.

1. Pattern A starts at 0 and adds 4 to each term.
   Pattern B starts at 0 and adds 2 to each term.

2. Pattern A starts at 0 and adds 3 to each term.
   Pattern B starts at 0 and adds 9 to each term.

3. Pattern A starts at 0 and adds 20 to each term.
   Pattern B starts at 0 and adds 5 to each term.

Use the table to answer Exercises 4–6.

Pattern A + 2	Pattern B + 8
0	
2	
	16
8	

4. Fill in the unknown terms in the table.

5. What is a relationship between the corresponding terms in Patterns A and B?

6. If a term in Pattern A is 20, what will be its corresponding term in Pattern B?

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7. Pattern A starts at 0 and adds 1 to each term. Pattern B starts at 0 and adds 6 to each term. If 5 is a term in Pattern A, what is its corresponding term in Pattern B?

8. Pattern A starts at 0 and adds 4 to each term. Pattern B starts at 0 and adds 8 to each term. If 24 is a term in Pattern A, what is its corresponding term in Pattern B?

9. Pattern A starts at 0 and adds 3 to each term. Pattern B starts at 0 and adds 12 to each term. If 72 is a term in Pattern B, what is its corresponding term in Pattern A?

10. **STEM Connection** Saffron is baking bread. She wrote these numerical patterns to record the amount of water and flour needed
Water (in cups): 3, 4, 5, 6, ...
Flour (in cups): 6, 8, 10, 12, ...
How many cups of water is needed when using 48 cups of flour

11. **Extend Your Thinking** A relationship between terms is that a term in Pattern A is $\frac{5}{4}$ times as much as its corresponding term in Pattern B. What could be the rules for each numerical pattern?

Reflect

How does knowing the rules of two numerical patterns help you determine an unknown corresponding term?

Math is... Mindset

How did you show others you respect their ideas?

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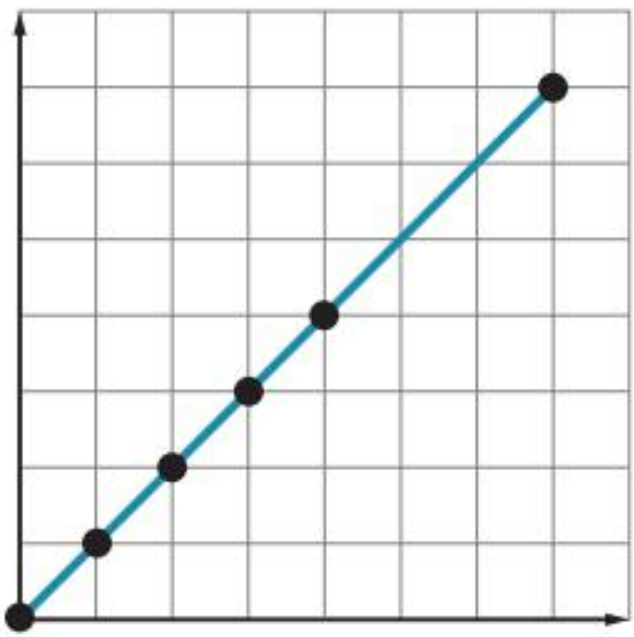
Lesson 14-6

Graphs of Numerical Patterns

Be Curious

What math do you see?



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Math is... Mindset

How do you act with your classmates to build safe classroom culture?

Learn

Martin wants to rent a bike for 7 days. The cost to rent a bike is $20 each day.

How can you determine how much it should cost Martin to rent a bike for 7 days?

You can make a 2-column table.

The first column shows the number of days of a rental.

The second column shows the cost of the bike rental.

Bikes and Trikes Rental

Days	Cost ($)
0	0
1	20
2	40
3	60
4	80

+ 1

+ 20

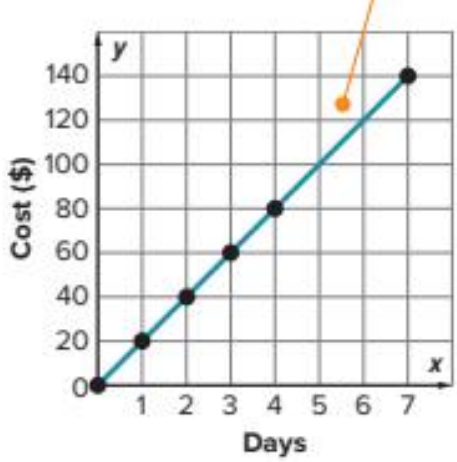
× 20

Math is... Modeling

How might writing the corresponding terms as ordered pairs help you solve this problem?

You can write corresponding terms as ordered pairs and plot the ordered pairs on a coordinate plane.

Draw a line to connect the points. Extend the line.



Renting a bike for 7 days costs $140.

Work Together

How much should it cost for Martin to rent a bike for $4\frac{1}{2}$ days? Explain your reasoning.

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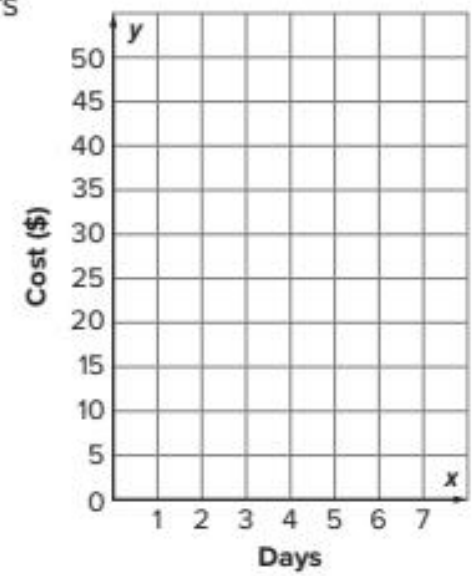
On My Own

Name _____

1. The Scooters and Stuff ental charges are shown in the table. Write the corresponding terms as ordered pairs and plot them on the coordinate plane.

Scooters and Stuff Rental		
Days	Cost ($)	Ordered Pair
0	0	
1	5	
2	10	
3	15	
4	20	



2. What is the rule for the pattern in the Days column of the table?

3. What is the rule for the pattern in the Cost ($) column of the table?

4. What is a relationship between the corresponding terms in the table?

5. How much should it cost to rent a scooter for 8 days?

6. Write the ordered pair and plot the point on the coordinate plane for 8 days.

7. How much should it cost to rent a scooter for $6\frac{1}{2}$ days?

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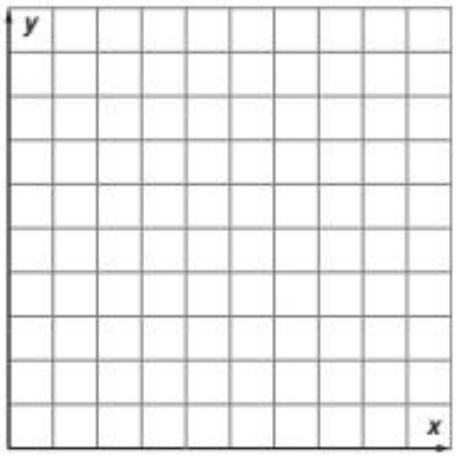
8. **STEM Connection** Malik learns that the light from a laser is stronger when the current is stronger. He is helping to make a laser where the rule for the current is add 10, and the rule for the light strength is add 2. Write the corresponding terms in a table, and then plot the points on the coordinate plane.



9. **Extend Your Thinking** How does graphing numerical patterns help you understand the relationship between the patterns?

Reflect

How can you plot ordered pairs consisting of corresponding terms from two patterns?

Math is... Mindset

How did you and your classmates build a safe classroom culture?

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Unit Review

Name _____

Vocabulary Review

Choose the correct word(s) to complete the sentence.

corresponding term	grouping symbols	order of operations
evaluate	numerical expression	parentheses
expression	numerical pattern	rule

1. A(n) _____ can be used to create a numerical pattern. (Lesson 14-5)

2. A(n) _____ represents a number using only numbers and symbols, but not unknown values. (Lesson 14-1)

3. The rules that dictate the sequence in which the operations in an expression should be evaluated are called the _____. (Lesson 14-3)

4. When you _____ an expression, you calculate a value for the expression. (Lesson 14-3)

5. A(n) _____ can consist of numbers, operations, symbols, and unknown values. (Lesson 14-3)

6. A(n) _____ is a sequence of numbers generated by a rule. (Lesson 14-4)

7. _____ are used to show where the group begins and where it ends. (Lesson 14-2)

8. _____ are numbers in numerical patterns that appear in identical places. (Lesson 14-5)

9. The grouping symbol ( ), called _____, is used in an expression so it is evaluated first. (Lesson 14-2)

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Review

10. What numerical expression represents *three more than seven*? (Lesson 14-1)

11. What operation is performed first (Lesson 14-3)

$8 + 16 \div 4 - 2$

12. What are the rules for Pattern C and Pattern D? What is the relationship between the corresponding terms of Pattern C and Pattern D? (Lesson 14-5)

Pattern C	Pattern D
0	0
1	12
2	24
3	36
4	48

13. What is a verbal description for the numerical expression $100 + (5 \times 10)$? (Lesson 14-2)

14. What expression represents *twelve less than eighteen*? (Lesson 14-1)

15. What is a verbal description for the numerical expression $10 - (8 \div 4)$? (Lesson 14-2)

16. What operation is performed first (Lesson 14-3)

$12 \times (4 + 6) \div 6$

17. What is the value of the expression? (Lesson 14-3)

$5 \times 25 - 18 \times 2$

18. Jared and Robert are playing different video games. Jared passes 2 levels each time he plays. Robert passes 3 levels each time he plays. When Jared passes 8 levels, how many levels will Robert have passed playing the same number of times? (Lesson 14-4)

19. Using words, compare these expressions. (Lesson 14-2)

$(8 \times 4) + 6$ $\qquad$ $8 \times (4 + 6)$

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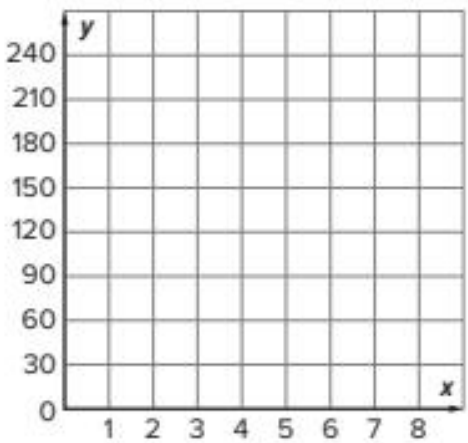
20. Cienna wants to know what she will earn mowing 8 lawns. The table shows the total amount she earns mowing different numbers of lawns.

Number of Lawns	Amount Earned ($)
0	0
1	30
2	60
3	90
4	120

a. How much will Cienna earn mowing 8 lawns? Use the coordinate plane to find the answer. (Lesson 14-5)

Lawn Mowing



b. How much will Cienna earn mowing 12 lawns? (Lesson 14-6)

21. What numerical expression represents *subtract eleven from twenty, then divide by three?* (Lesson 14-1)

22. What is a verbal description for the numerical expression $(6 \div 2) + 3$? (Lesson 14-2)

23. What numerical expression represents *add three and six, then multiply by twenty*? (Lesson 14-1)

24. What is the value of the expression? (Lesson 14-3)

$6 \times (8 - 3) + 14$

25. Pattern A starts at 0 and adds 4. Pattern B starts at 0 and adds 8. What is the term for Pattern B when Pattern A's term is 24? (Lesson 14-4)

26. What is the value of the expression? (Lesson 14-3)

$250 - (12 \times 5) - 10 \times 2$

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Performance Task

Malik has programmed a light show for a concert that will be played against a rectangular shaped screen above the stage.

Part A: Each time he flashes lights, Malik flashes red lights 2 more times and blue lights 3 more times. Start at 0 and write the next 4 terms of the sequences for the red and blue lights.

Part B: The table shows the horizontal and vertical distances of a photograph in feet from the bottom left corner as it moves across the screen.

Horizontal Distance (ft)	Vertical Distance (ft)
0	0
1	4
2	8
3	12

What is the rule for the Horizontal Distance and Vertical Distance? What is the relationship between the corresponding terms in the Horizontal and Vertical Distances?

Reflect

How can I use expressions to find a relationship between two sets of number patterns?

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Unit 14

Fluency Practice

Name _____

Fluency Strategy

You can choose a strategy to multiply. You can use an area model, partial products, or an algorithm.

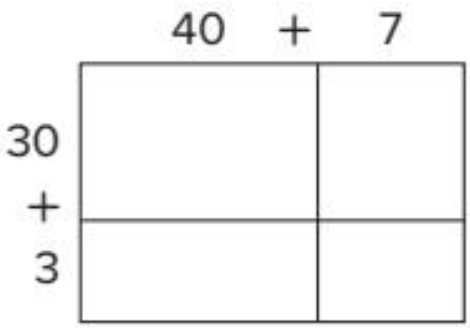
Partial Products

256		
× 31		
6,000	←	30 × 200
1,500	←	30 × 50
180	←	30 × 6
200	←	1 × 200
50	←	1 × 50
+ 6	←	1 × 6
7,936		

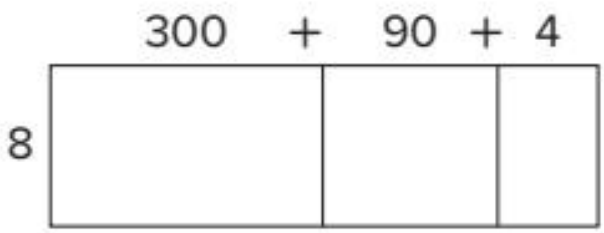
Fluency Flash

Complete the area models. Then solve.

1. 33 × 47 = _____



2. 394 × 8 = _____



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Fluency Check

What is the product?

3. $\begin{array}{r} 56 \\ \times\ 28 \\ \hline \end{array}$

4. $\begin{array}{r} 948 \\ \times\ 5 \\ \hline \end{array}$

5. 39 × 65 = _____

6. 697 × 86 = _____

7. 25 × 7 = _____

8. $\begin{array}{r} 175 \\ \times\ 23 \\ \hline \end{array}$

9. $\begin{array}{r} 258 \\ \times\ 49 \\ \hline \end{array}$

10. 62 × 37 = _____

11. 88 × 9 = _____

12. 52 × 41 = _____

Fluency Talk

Explain to a friend how using partial products is like using algorithm to multiply and how it is different.

How are partial products related to area models?

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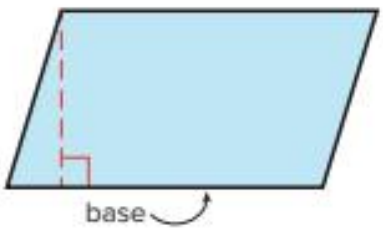
Glossary/Glosario

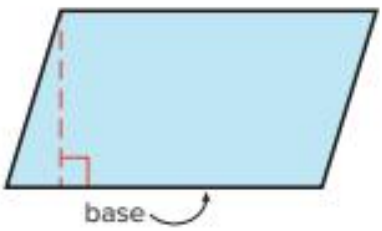
English | **Spanish/Español**

Bb

base The side of a plane figure or 3-dimensional solid that is used to find its height by drawing a line from the opposite angle.



base Lado de una figura plana que se usa para calcular su altura trazando una recta desde el ángulo opuesto.

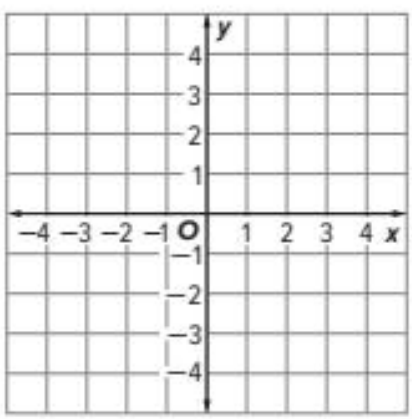


Cc

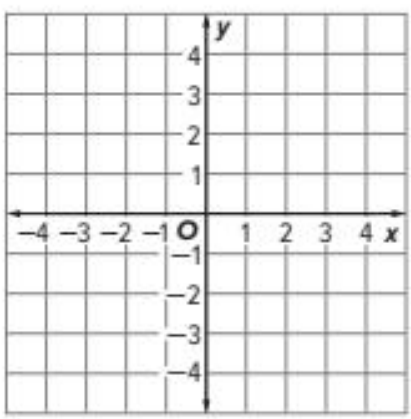
composite solid figure A solid figure that is made up of two or more solids.

figura compuestra Figura conformada por dos o más figuras tridimensionales.

coordinate plane A plane in which a horizontal number line and a vertical number line intersect at a right angle at the point where each line is zero.



plano de coordenanas Plano en que una recta numérica horizontal y una recta numérica vertical se intersecan en ángulo recto en el punto donde cada recta es cero.



corresponding terms Numbers that are in the same position in two numerical patterns.

términos correspondientes Números que están en la misma posición en dos patrones numéricos.

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English	Spanish/Español
Ee	
evaluate To find the value of an algebraic expression by replacing variables with numbers.	evaluar Calcular el valor de una expresión algebraica reemplazando las variables con números.
exponent The number of times a base is multiplied by itself. In 3^2, the exponent is 2.	exponente Número de veces que la base se multiplica por sí misma. En 3^2, el exponente es 2.
expression A combination of numbers, variables, and operation symbols. $5 + 7$	expression Combinación de números, variables y símbolos de operaciones. $5 + 7$
Gg	
grouping symbol Parentheses ( ) or brackets [ ] that tell you where that group starts and ends. They help to determine the order when evaluating a numerical expression.	símbolo de agrupación Paréntesis ( ) o corchetes [ ] que indican el comienzo y el fin de un grupo. Sirven para ordenar y evaluar una expresión numérica.
Hh	
hierarchy of figures A classification of figures into categories and subcategories.	jerarquía de figuras Clasificación de figuras en categorías y subcategorías.
Nn	
numerical expression A combination of numbers and operations.	expresión numérica Combinación de números y operaciones.

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Oo

order of operations Rules that tell what order to follow when evaluating expressions.

The order of operations says:

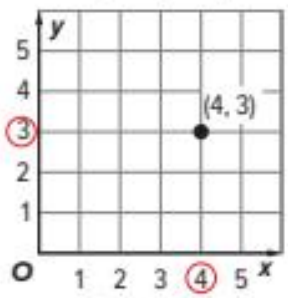
1. Evaluate numerical expressions inside grouping symbols first.
2. Multiply and divide in order, from left to right.
3. Add and subtract in order, from left to right.

orden de la operaciones Reglas que indican qué orden seguir al evaluar una expresión:

1. Evalúa dentro de los paréntesis ( ).
2. Multiplica o divide de izquierda a derecha.
3. Suma o resta de izquierda a derecha.

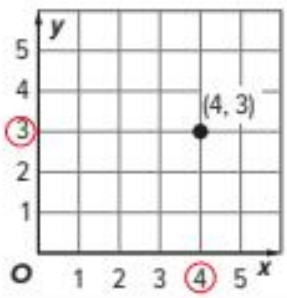
ordered pair A pair of numbers that are the coordinates of a point in a coordinate plane or grid in this order (horizontal coordinate, vertical coordinate).

Example: (4, 3)

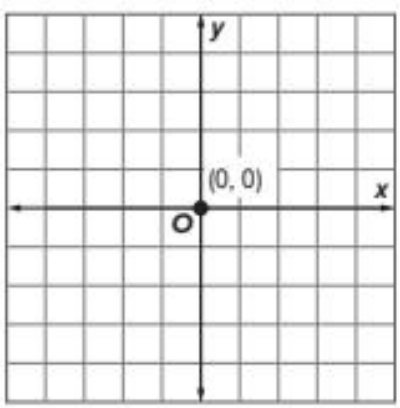


par ordenado Par de números que son coordenadas de un punto en un plano de coordenadas o un cuadriculado, en este orden (coordenada horizontal, coordenada vertical).

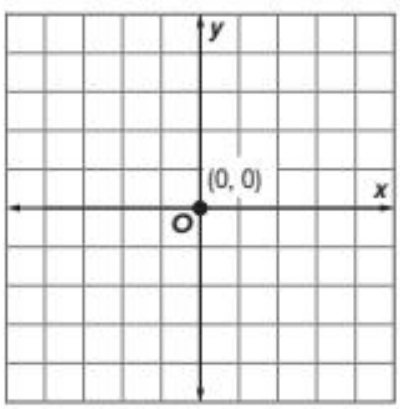
Ejemplo: (4, 3)



origin The point (0, 0) on a coordinate graph where the vertical axis meets the horizontal axis.



origen El punto (0,0) en una gráfica de coordenadas donde el eje vertical interseca el eje horizontal.



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English	Spanish/Español

Pp

power of 10 A number obtained by raising 10 to a given exponent.

$10^2 = 10 \times 10 = 100$

potencia de 10 Un número que se obtiene elevando 10 a un exponente dado.

$10^2 = 10 \times 10 = 100$

Rr

range The difference between the greatest and the least numbers in a set of data.

rango La diferencia entre los números mayores y menores en un conjunto de datos.

Ss

subcategory Common properties within a larger category.

subcategoría Propiedades comunes dentro de una categoría más amplia.

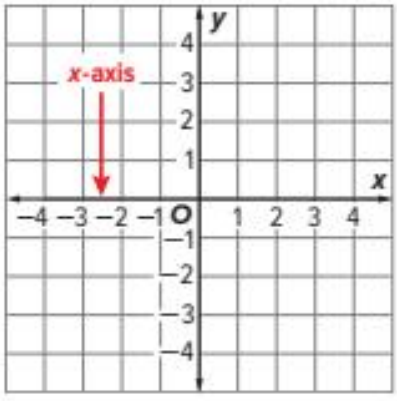
Vv

volume The number of cubic units needed to fill a 3-dimensional figure or solid figure.

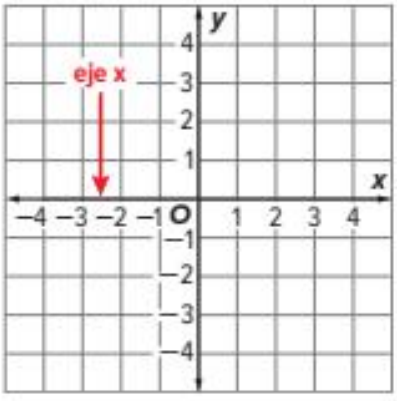
volumen Número de unidades cúbicas necesarias para llenar una figura tridimensional o sólida.

Xx

***x*-axis** The horizontal axis in a coordinate plane.



eje *x* Eje horizontal en una coordenada.



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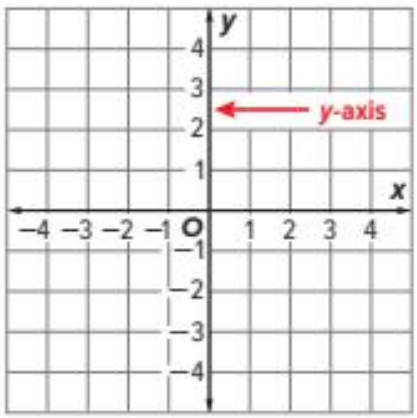
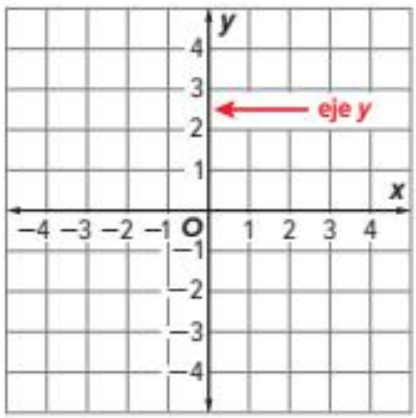
English	Spanish/Español
x-coordinate The first part of an ordered pair that indicates how far to the left or the right of the *y*-axis the corresponding point is. (1, 2): 1 unit to the right of the *y*-axis	coordenada x Primera parte de un par ordenado que indica la distancia a que está el punto correspondiente a la izquierda o a la derecha del eje *y*. (1, 2): 1 unidad a la derecha del eje *y*

Yy

y-axis The vertical axis in a coordinate plane.



eje *y* El eje vertical en una coordenada.



y-coordinate The second part of an ordered pair that indicates how far above or below the *x*-axis the corresponding point is. (1, 2): 2 units above the *x*-axis	coordenada *y* Segunda parte de un par ordenado que indica la distancia a que está el punto correspondiente por encima o por debajo del eje *x*. (1, 2): 2 unidades por encima del eje *x*

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