

Student Lesson Pages

Lessons 1 - 100

Algebra • Evaluate Numerical Expressions

A **numerical expression** is a mathematical phrase that includes only numbers and operation symbols.

You **evaluate** the expression when you perform all the computations to find its value.

To evaluate an expression, use the **order of operations**.

Order of Operations

1. Parentheses
2. Multiply and Divide
3. Add and Subtract

Evaluate the expression $(10 + 6 \times 6) - 4 \times 10$.

Step 1 Start with computations inside the parentheses.

$$10 + 6 \times 6$$

Step 2 Perform the order of operations inside the *parentheses*.

Multiply and divide from left to right.

$$10 + 6 \times 6 = 10 + \underline{36}$$

Add and subtract from left to right.

$$10 + 36 = \underline{46}$$

Step 3 Rewrite the expression with the parentheses evaluated.

$$46 - 4 \times 10$$

Step 4 *Multiply and divide* from left to right.

$$46 - 4 \times 10 = 46 - \underline{40}$$

Step 5 *Add and subtract* from left to right.

$$46 - 40 = \underline{6}$$

So, $(10 + 6 \times 6) - 4 \times 10 = 6$.

Evaluate the numerical expression.

1. $8 - (7 \times 1)$

2. $5 - 2 + 12 \div 4$

3. $8 \times (16 \div 2)$

4. $4 \times (28 - 20 \div 2)$

5. $(30 - 9 \div 3) \div 9$

6. $(6 \times 6 - 9) - 9 \div 3$

7. $11 \div (8 + 9 \div 3)$

8. $13 \times 4 - 65 \div 13$

9. $9 + 4 \times 6 - 65 \div 13$

Evaluate Numerical Expressions

Evaluate the numerical expression.

1. $24 \times 5 - 41$
120 - 41

2. $(32 - 20) \div 4$

3. $16 \div (2 + 6)$

4. $15 \times (8 - 3)$

79

5. $4 \times 8 - 7$

6. $27 + 5 \times 6$

7. $3 \div 3 \times 4 + 6$

8. $14 + 4 \times 4 - 9$

Rewrite the expression with parentheses to equal the given value.

9. $3 \times 4 - 1 + 2$

value: 11

10. $2 \times 6 \div 2 + 1$

value: 4

11. $5 + 3 \times 2 - 6$

value: 10

Problem Solving 

12. Sandy has several pitchers to hold lemonade for the school bake sale. Two pitchers can hold 64 ounces each, and four pitchers can hold 48 ounces each. How many total ounces can Sandy's pitchers hold?

13. At the bake sale, Jonah sold 4 cakes for \$8 each and 36 muffins for \$2 each. What was the total amount, in dollars, that Jonah received from these sales?

Lesson Objective: Evaluate numerical expressions with parentheses, brackets, and braces.

Algebra • Grouping Symbols

Parentheses (), *brackets* [], and *braces* { }, are different grouping symbols used in expressions. To evaluate an expression with different grouping symbols, perform the operation in the innermost set of grouping symbols first. Then evaluate the expression from the inside out.

Evaluate the expression $2 \times [(9 \times 4) - (17 - 6)]$.

Step 1 Perform the operations in the *parentheses* first.

$$2 \times [(9 \times 4) - (17 - 6)]$$

$$2 \times [\underline{36} - \underline{11}]$$

Step 2 Next perform the operations in the *brackets*.

$$2 \times [36 - 11]$$

$$2 \times \underline{25}$$

Step 3 Then multiply.

$$2 \times 25 = \underline{50}$$

So, $2 \times [(9 \times 4) - (17 - 6)] = \underline{50}$

Evaluate the numerical expression.

1. $4 \times [(15 - 6) \times (7 - 3)]$ **2.** $40 - [(8 \times 7) - (5 \times 6)]$ **3.** $60 \div [(20 - 6) + (14 - 8)]$

$$4 \times [9 \times \underline{\hspace{2cm}}]$$

$$4 \times [\underline{\hspace{2cm}}]$$

4. $5 + [(10 - 2) + (4 - 1)]$ **5.** $3 \times [(9 + 4) - (2 \times 6)]$ **6.** $32 \div [(7 \times 2) - (2 \times 5)]$

Grouping Symbols

Evaluate the numerical expression.

1. $5 \times [(11 - 3) - (13 - 9)]$

$5 \times [8 - (13 - 9)]$

$5 \times [8 - 4]$

5×4

20

2. $30 - [(9 \times 2) - (3 \times 4)]$

3. $36 \div [(14 - 5) - (10 - 7)]$

4. $7 \times [(9 + 8) - (12 - 7)]$

5. $[(25 - 11) + (15 - 9)] \div 5$

6. $[(8 \times 9) - (6 \times 7)] - 15$

7. $8 \times \{[(7 + 4) \times 2] - [(11 - 7) \times 4]\}$

8. $\{[(8 - 3) \times 2] + [(5 \times 6) - 5]\} \div 5$

Problem Solving 

Use the information at the right for 9 and 10.

9. Write an expression to represent the total number of muffins and cupcakes Joan sells in 5 days.

Joan has a cafe. Each day, she bakes 24 muffins. She gives away 3 and sells the rest. Each day, she also bakes 36 cupcakes. She gives away 4 and sells the rest.

10. Evaluate the expression to find the total number of muffins and cupcakes Joan sells in 5 days.

Algebra • Numerical Expressions

Write words to match the expression.

$$6 \times (12 - 4)$$

Think: Many word problems involve finding the cost of a store purchase.

Step 1 Examine the expression.

- What operations are in the expression? multiplication and subtraction

Step 2 Describe what each part of the expression can represent when finding the cost of a store purchase.

- What can multiplying by 6 represent? buying 6 of the same item

Step 3 Write the words.

- Joe buys 6 DVDs. Each DVD costs \$12. If Joe receives a \$4 discount on each DVD, what is the total amount of money Joe spends?

1. What is multiplied and what is subtracted?

2. What part of the expression is the price of the item?

3. What can subtracting 4 from 12 represent?

Write words to match the expression.

4. $4 \times (10 - 2)$

5. $3 \times (6 - 1)$

Numerical Expressions

Write an expression to match the words.

1. Ethan collected 16 seashells. He lost 4 of them while walking home.

$$16 - 4$$

2. Yasmine bought 4 bracelets. Each bracelet cost \$3.
-

3. Amani did 10 jumping jacks. Then she did 7 more.
-

4. Darryl has a board that is 8 feet long. He cuts it into pieces that are each 2 feet long.
-

Write words to match the expression.

5. $3 + (4 \times 12)$

6. $36 \div 4$

7. $24 - (6 + 3)$

Draw a line to match the expression with the words.

8. Ray picked 30 apples and put them equally into 3 baskets. Then he ate two of the apples in a basket.

$(3 \times 2) \times 30$

9. Quinn had \$30. She bought a notebook for \$3 and a pack of pens for \$2.

$(30 \div 3) - 2$

10. Colleen runs 3 miles twice a day for 30 days.

$30 - (3 + 2)$

Problem Solving 

11. Kylie has 14 polished stones. Her friend gives her 6 more stones. Write an expression to match the words.
-

12. Rashad had 25 stamps. He shared them equally among himself and 4 friends. Then Rashad found 2 more stamps in his pocket. Write an expression to match the words.
-

Lesson Objective: Use two rules to generate a numerical pattern and identify the relationship between the corresponding terms in the patterns.

Numerical Patterns

A soccer league has 5 teams. How many players are needed for 5 teams? How many soccer balls are needed by the 5 teams?

	Number of Teams	1	2	3	4	7
Add <u>8</u> .	Number of Players	8	16	24	32	56
Add <u>4</u> .	Number of Soccer Balls	4	8	12	16	28

Step 1 Find a rule that could be used to find the number of players for the number of teams.

Think: In the pattern 8, 16, 24, 32, you add 8 to get the next term.

As the number of teams increases by 1, the number of players increases by 8. So the rule is to add 8.

Step 2 Find a rule that could be used to find the number of soccer balls for the number of teams.

Think: In the pattern 4, 8, 12, 16, you add 4 to get the next term.

As the number of teams increases by 1, the number of soccer balls needed increases by 4. So the rule is to add 4.

Step 3 For 7 teams, multiply the number of players by $\frac{1}{2}$ to find the number of soccer balls.

So, for 7 teams, 56 players will need 28 soccer balls.

Complete the rule that describes how one sequence is related to the other. Use the rule to find the unknown term.

Number of Teams	1	2	3	4	8	10
Number of Players	15	30	45	60	120	
Number of Bats	5	10	15	20		50

1. Divide the number of players by _____ to find the number of bats.
2. Multiply the number of bats by _____ to find the number of players.

Numerical Patterns

Complete the rule that describes how one sequence is related to the other. Use the rule to find the unknown term.

1. Multiply the number of laps by **50** to find the number of yards.

2. Multiply the number of pounds by _____ to find total cost.

Think: The number of yards is 50 times the number of laps.

Swimmers	1	2	3	4
Number of Laps	4	8	12	16
Number of Yards	200	400	600	800

Boxes	1	2	3	4	6
Number of Pounds	3	6	9	12	18
Total Cost (\$)	12	24	36	48	

3. Multiply the number of hours by _____ to find the number of miles.

4. Multiply the number of hours by _____ to find the amount earned.

Cars	1	2	3	4
Number of Hours	2	4	6	8
Number of Miles	130	260	390	

Days	1	2	3	4	7
Number of Hours	8	16	24	32	56
Amount Earned (\$)	96	192	288	384	

Problem Solving 

5. A map distance of 5 inches represents 200 miles of actual distance. Suppose the distance between two cities on the map is 7 inches. What is the actual distance between the two cities? Write the rule you used to find the actual distance.

6. To make one costume, Rachel uses 6 yards of material and 3 yards of trim. Suppose she uses a total of 48 yards of material to make several costumes. How many yards of trim does she use? Write the rule you used to find the number of yards of trim.

Problem Solving • Find a Rule

Samantha is making a scarf with fringe around it. Each section of fringe is made of 4 pieces of yarn with 2 beads holding them together. There are 42 sections of fringe on Samantha’s scarf. How many wooden beads and how many pieces of yarn are on Samantha’s scarf?

Read the Problem	Solve the Problem						
<p>What do I need to find? Possible answer: I need to find the number of beads and the number of pieces of yarn on Samantha’s scarf.</p>	Sections of Fringe	1	2	3	4	6	42
	Number of Beads	2	4	6	8	12	84
	Pieces of Yarn	4	8	12	16	24	168
<p>What information do I need to use? Possible answer: I need to use the number of sections on the scarf, and that each section has 4 pieces of yarn and 2 beads.</p>	<p>Possible answer: I can multiply the number of sections by 2 to find the number of beads. Then, I can multiply the number of sections by 4, or the number of beads by 2, to find the number of pieces of yarn. So, Samantha’s scarf has 2×42, or 84 beads, and 4×42, or 168 pieces of yarn.</p>						
<p>How will I use the information? I will use the information to search for patterns to solve a simpler problem.</p>							

1. A rectangular tile has a decorative pattern of 3 equal-sized squares, each of which is divided into 2 same-sized triangles. If Marnie uses 36 of these tiles on the wall behind her kitchen stove, how many triangles are displayed?

2. Leta is making strawberry-almond salad for a party. For every head of lettuce that she uses, she adds 5 ounces of almonds and 10 strawberries. If she uses 75 ounces of almonds, how many heads of lettuce and how many strawberries does Leta use?

Problem Solving • Find a Rule

Write a rule and complete the table. Then answer the question.

1. Faye buys 15 T-shirts, which are on sale for \$3 each. How much money does Faye spend?

Number of T-Shirts	1	2	3	5	10	15
Amount Spent (\$)	3	6	9			

Possible rule:

Multiply the number
of T-shirts by 3.

The total amount Faye spends is **\$45**.

2. The Gilman family joins a fitness center. They pay \$35 per month. By the 12th month, how much money will the Gilman family have spent?

Number of Months	1	2	3	4	5	12
Total Amount of Money Spent (\$)	35	70				

Possible rule:

The Gilman family will have spent _____.

3. Hettie is stacking paper cups. Each stack of 15 cups is 6 inches high. What is the total height of 10 stacks of cups?

Number of stacks	1	2	3	10
Height (in.)	6	12	18	

Possible rule:

The total height of 10 stacks is _____.

Lesson Objective: Graph the relationship between two numerical patterns on a coordinate grid.

Name _____

Graph and Analyze Relationships

The scale on a map is 1 in. = 4 mi. Two cities are 5 inches apart on the map. What is the actual distance between the two cities?

Step 1 Make a table that relates the map distances to the actual distances.

Map Distance (in.)	1	2	3	4	5
Actual Distance (mi)	4	8	12	16	?

Step 2 Write the number pairs in the table as ordered pairs.

(1, 4), (2, 8), (3, 12), (4, 16), (5, ?)

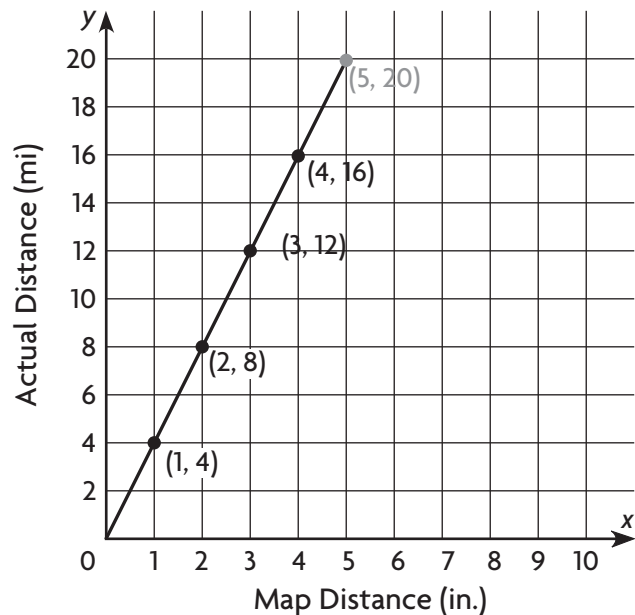
Step 3 Graph the ordered pairs. Connect the points with a line from the origin.

Possible rule: Multiply the map distance by 4 to get the actual distance.

Step 4 Use the rule to find the actual distance between the two cities.

So, two cities that are 5 inches apart on the map are actually 5×4 , or 20 miles apart.

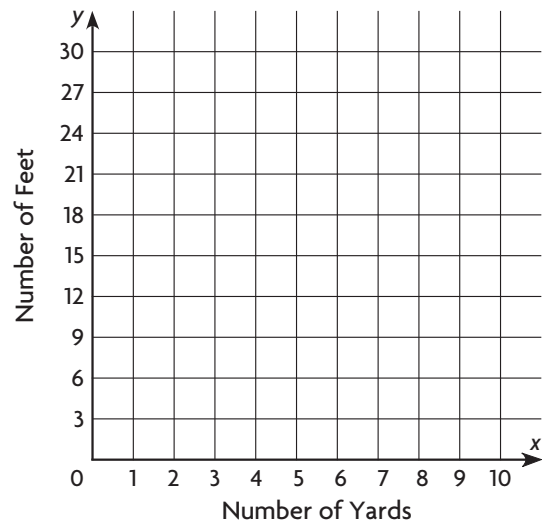
Plot the point (5, 20) on the graph.



Graph and label the related number pairs as ordered pairs. Then complete and use the rule to find the unknown term.

- Multiply the number of yards by _____ to find the number of feet.

Number of Yards	1	2	3	4	5
Number of Feet	3	6	9	12	

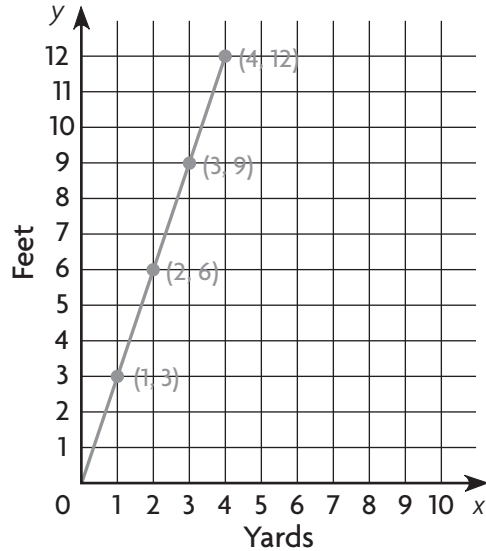


Graph and Analyze Relationships

Graph and label the related number pairs as ordered pairs. Then complete and use the rule to find the unknown term.

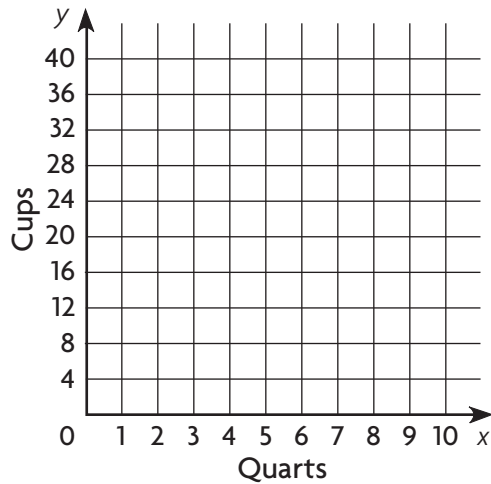
1. Multiply the number of yards by 3 to find the number of feet.

Yards	1	2	3	4
Feet	3	6	9	12



2. Multiply the number of quarts by _____ to find the number of cups that measure the same amount.

Quarts	1	2	3	4	5
Cups	4	8	12	16	



Problem Solving



3. How can you use the graph for Exercise 2 to find how many cups are in 9 quarts?

4. How many cups are equal to 9 quarts? _____

Place Value and Patterns

You can use a place-value chart and patterns to write numbers that are 10 times as much as or $\frac{1}{10}$ of any given number.

Each place to the right is $\frac{1}{10}$ of the value of the place to its left.

	$\frac{1}{10}$ of the hundred thousands place	$\frac{1}{10}$ of the ten thousands place	$\frac{1}{10}$ of the thousands place	$\frac{1}{10}$ of the hundreds place	$\frac{1}{10}$ of the tens place
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
10 times the ten thousands place	10 times the thousands place	10 times the hundreds place	10 times the tens place	10 times the ones place	

Each place to the left is 10 times the value of the place to its right.

Find $\frac{1}{10}$ of 600.

$\frac{1}{10}$ of 6 hundreds is 6 tens.

So, $\frac{1}{10}$ of 600 is 60.

Find 10 times as much as 600.

10 times as much as 6 hundreds is 6 thousands.

So, 10 times as much as 600 is 6,000.

Use place-value patterns to complete the table.

Number	10 times as much as	$\frac{1}{10}$ of
1. 200		
2. 10		
3. 700		
4. 5,000		

Number	10 times as much as	$\frac{1}{10}$ of
5. 900		
6. 80,000		
7. 3,000		
8. 40		

Place Value and Patterns

Complete the sentence.

1. 40,000 is 10 times as much as 4,000.
2. 90 is $\frac{1}{10}$ of _____.
3. 800 is 10 times as much as _____.
4. 5,000 is $\frac{1}{10}$ of _____.

Use place-value patterns to complete the table.

Number	10 times as much as	$\frac{1}{10}$ of
5. 100		
6. 7,000		
7. 300		
8. 80		

Number	10 times as much as	$\frac{1}{10}$ of
9. 2,000		
10. 900		
11. 60,000		
12. 500		

Problem Solving 

13. The Eatery Restaurant has 200 tables. On a recent evening, there were reservations for $\frac{1}{10}$ of the tables. How many tables were reserved?
14. Mr. Wilson has \$3,000 in his bank account. Ms. Nelson has 10 times as much money in her bank account as Mr. Wilson has in his bank account. How much money does Ms. Nelson have in her bank account?

Place Value of Whole Numbers

You can use a place-value chart to help you understand whole numbers and the value of each digit. A **period** is a group of three digits within a number separated by a comma.

Millions Period			Thousands Period			Ones Period		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		2,	3	6	7,	0	8	9

Standard form: 2,367,089

Expanded Form: Multiply each digit by its place value, and then write an addition expression.

$$(2 \times 1,000,000) + (3 \times 100,000) + (6 \times 10,000) + (7 \times 1,000) + (8 \times 10) + (9 \times 1)$$

Word Form: Write the number in words. Notice that the millions and the thousands periods are followed by the period name and a comma.

two million, three hundred sixty-seven thousand, eighty-nine

To find the value of an underlined digit, multiply the digit by its place value. In 2,367,089, the value of 2 is $2 \times 1,000,000$, or 2,000,000.

Write the value of the underlined digit.

1. 153,732,991

2. 236,143,802

3. 264,807

4. 78,209,146

Write the number in two other forms.

5. 701,245

6. 40,023,032

Place Value of Whole Numbers

Write the value of the underlined digit.

1. 5,165,874

60,000

2. 281,480,100

3. 7,270

4. 89,170,326

5. 7,050,423

6. 646,950

7. 37,123,745

8. 315,421,732

Write the number in two other forms.

9. 15,409

10. 100,203

11. 6,007,200

12. 32,005,008

Problem Solving



13. The U.S. Census Bureau has a population clock on the Internet. On a recent day, the United States population was listed as 310,763,136. Write this number in word form.

14. In 2008, the population of 10- to 14-year-olds in the United States was 20,484,163. Write this number in expanded form.

Thousandths

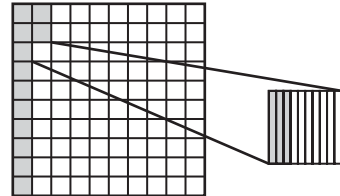
Thousandths are smaller parts than hundredths. If one hundredth is divided into 10 equal parts, each part is one **thousandth**.

Write the decimal shown by the shaded parts of the model.

One column of the decimal model is shaded. It represents one tenth, or 0.1.

Two small squares of the decimal model are shaded. They represent two hundredths, or 0.02.

A one-hundredth square is divided into 10 equal parts, or thousandths. Three columns of the thousandth square are shaded. They represent 0.003.



So, 0.123 of the decimal model is shaded.

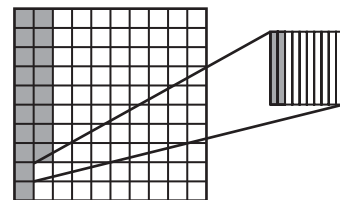
The relationship of a digit in different place-value positions is the same for decimals as for whole numbers.

Write the decimals in a place-value chart.

Ones	Tenths	Hundredths	Thousandths
0	8		
0	0	8	
0	0	0	8

0.08 is $\frac{1}{10}$ of 0.8.
 0.08 is 10 times as much as 0.008.

- Write the decimal shown by the shaded parts of the model.



Use place-value patterns to complete the table.

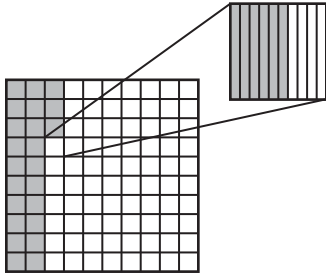
Decimal	10 times as much as	$\frac{1}{10}$ of
2. 0.1		
3. 0.03		
4. 0.5		

Decimal	10 times as much as	$\frac{1}{10}$ of
5. 0.02		
6. 0.4		
7. 0.06		

Thousandths

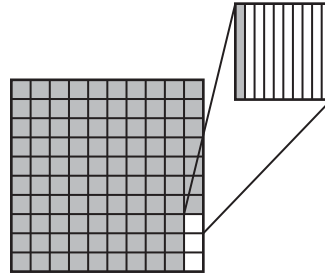
Write the decimal shown by the shaded parts of each model.

1.



0.236

2.



Think: 2 tenths, 3 hundredths, and 6 thousandths are shaded

Complete the sentence.

3. 0.4 is 10 times as much as _____.

4. 0.003 is $\frac{1}{10}$ of _____.

Use place-value patterns to complete the table.

Decimal	10 times as much as	$\frac{1}{10}$ of
5. 0.1		
6. 0.09		
7. 0.04		
8. 0.6		

Decimal	10 times as much as	$\frac{1}{10}$ of
9. 0.08		
10. 0.2		
11. 0.5		
12. 0.03		

Problem Solving



13. The diameter of a dime is seven hundred five thousandths of an inch. Complete the table by recording the diameter of a dime.

14. What is the value of the 5 in the diameter of a half dollar?

15. Which coins have a diameter with a 5 in the hundredths place?

U.S. Coins	
Coin	Diameter (in inches)
Penny	0.750
Nickel	0.835
Dime	
Quarter	0.955
Half dollar	1.205

Algebra • Powers of 10 and Exponents

You can represent repeated factors with a base and an exponent.

Write $10 \times 10 \times 10 \times 10 \times 10 \times 10$ in exponent form.

10 is the repeated factor, so 10 is the **base**.

The base is repeated 6 times, so 6 is the **exponent**.

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6$$

A base with an exponent can be written in words.

$$10^6 \leftarrow \text{exponent}$$

$$\uparrow$$

$$\text{base}$$

Write 10^6 in words.

The exponent 6 means “the sixth power.”

10^6 in words is “the sixth power of ten.”

You can read 10^2 in two ways: “ten squared” or “the second power of ten.”

You can also read 10^3 in two ways: “ten cubed” or “the third power of ten.”

Write in exponent form and in word form.

1. $10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$

exponent form: _____ word form: _____

2. $10 \times 10 \times 10$

exponent form: _____ word form: _____

3. $10 \times 10 \times 10 \times 10 \times 10$

exponent form: _____ word form: _____

Find the value.

4. 10^4

5. 2×10^3

6. 6×10^2

Powers of 10 and Exponents

Write in exponent form and word form.

1. $10 \times 10 \times 10$

2. 10×10

3. $10 \times 10 \times 10 \times 10$

exponent form: 10³

exponent form: _____

exponent form: _____

word form: the

word form: _____

word form: _____

third power

of ten

Find the value.

4. 10^3

5. 4×10^2

6. 9×10^4

7. 10^1

8. 10^5

9. 5×10^1

10. 7×10^3

11. 8×10^0

Problem Solving

12. The moon is about 240,000 miles from Earth. What is this distance written as a whole number multiplied by a power of ten?

13. The sun is about 93×10^6 miles from Earth. What is this distance written as a whole number?

Lesson Objective: Use a basic fact and a pattern to multiply mentally by multiples of 10, 100, and 1,000.

Algebra • Multiplication Patterns

You can use basic facts, patterns, and powers of 10 to help you multiply whole numbers by multiples of 10, 100, and 1,000.

Use mental math and a pattern to find $90 \times 6,000$.

- 9×6 is a basic fact. $9 \times 6 = 54$
- Use basic facts, patterns, and powers of 10 to find $90 \times 6,000$.

$$\begin{aligned} 9 \times 60 &= (9 \times 6) \times 10^1 \\ &= 54 \times 10^1 \\ &= 54 \times 10 \\ &= 540 \end{aligned}$$

$$\begin{aligned} 9 \times 600 &= (9 \times 6) \times 10^2 \\ &= 54 \times 10^2 \\ &= 54 \times 100 \\ &= 5,400 \end{aligned}$$

$$\begin{aligned} 9 \times 6,000 &= (9 \times 6) \times 10^3 \\ &= 54 \times 10^3 \\ &= 54 \times 1,000 \\ &= 54,000 \end{aligned}$$

$$\begin{aligned} 90 \times 6,000 &= (9 \times 6) \times (10 \times 1,000) \\ &= 54 \times 10^4 \\ &= 54 \times 10,000 \\ &= 540,000 \end{aligned}$$

So, $90 \times 6,000 = 540,000$.

Use mental math to complete the pattern.

1. $3 \times 1 = 3$

$3 \times 10^1 = \underline{\hspace{2cm}}$

$3 \times 10^2 = \underline{\hspace{2cm}}$

$3 \times 10^3 = \underline{\hspace{2cm}}$

2. $8 \times 2 = 16$

$(8 \times 2) \times 10^1 = \underline{\hspace{2cm}}$

$(8 \times 2) \times 10^2 = \underline{\hspace{2cm}}$

$(8 \times 2) \times 10^3 = \underline{\hspace{2cm}}$

3. $4 \times 5 = 20$

$(4 \times 5) \times \underline{\hspace{2cm}} = 200$

$(4 \times 5) \times \underline{\hspace{2cm}} = 2,000$

$(4 \times 5) \times \underline{\hspace{2cm}} = 20,000$

4. $7 \times 6 = \underline{\hspace{2cm}}$

$(7 \times 6) \times \underline{\hspace{2cm}} = 420$

$(7 \times 6) \times \underline{\hspace{2cm}} = 4,200$

$(7 \times 6) \times \underline{\hspace{2cm}} = 42,000$

Multiplication Patterns

Use mental math to complete the pattern.

1. $8 \times 3 = 24$

$$(8 \times 3) \times 10^1 = \underline{240}$$

$$(8 \times 3) \times 10^2 = \underline{2,400}$$

$$(8 \times 3) \times 10^3 = \underline{24,000}$$

2. $5 \times 6 = \underline{\hspace{2cm}}$

$(5 \times 6) \times 10^1 = \underline{\hspace{2cm}}$

$(5 \times 6) \times 10^2 = \underline{\hspace{2cm}}$

$(5 \times 6) \times 10^3 = \underline{\hspace{2cm}}$

3. $3 \times \underline{\hspace{2cm}} = 27$

$(3 \times 9) \times 10^1 = \underline{\hspace{2cm}}$

$(3 \times 9) \times 10^2 = \underline{\hspace{2cm}}$

$(3 \times 9) \times 10^3 = \underline{\hspace{2cm}}$

4. $\underline{\hspace{2cm}} \times 4 = 28$

$(7 \times 4) \times \underline{\hspace{2cm}} = 280$

$(7 \times 4) \times \underline{\hspace{2cm}} = 2,800$

$(7 \times 4) \times \underline{\hspace{2cm}} = 28,000$

5. $6 \times 8 = \underline{\hspace{2cm}}$

$(6 \times 8) \times 10^2 = \underline{\hspace{2cm}}$

$(6 \times 8) \times 10^3 = \underline{\hspace{2cm}}$

$(6 \times 8) \times 10^4 = \underline{\hspace{2cm}}$

6. $\underline{\hspace{2cm}} \times 4 = 16$

$(4 \times 4) \times 10^2 = \underline{\hspace{2cm}}$

$(4 \times 4) \times 10^3 = \underline{\hspace{2cm}}$

$(4 \times 4) \times 10^4 = \underline{\hspace{2cm}}$

Use mental math and a pattern to find the product.

7. $(2 \times 9) \times 10^2 = \underline{\hspace{2cm}}$

8. $(8 \times 7) \times 10^2 = \underline{\hspace{2cm}}$

9. $(9 \times 6) \times 10^3 = \underline{\hspace{2cm}}$

10. $(3 \times 7) \times 10^3 = \underline{\hspace{2cm}}$

11. $(5 \times 9) \times 10^4 = \underline{\hspace{2cm}}$

12. $(4 \times 8) \times 10^4 = \underline{\hspace{2cm}}$

13. $(8 \times 8) \times 10^3 = \underline{\hspace{2cm}}$

14. $(6 \times 4) \times 10^4 = \underline{\hspace{2cm}}$

15. $(5 \times 5) \times 10^3 = \underline{\hspace{2cm}}$

Problem Solving 

16. The Florida Everglades welcomes about 2×10^3 visitors per day. Based on this, about how many visitors come to the Everglades per week?

17. The average person loses about 8×10^1 strands of hair each day. About how many strands of hair would the average person lose in 4×10^2 days, or about 1 year and 1 month?

Algebra • Multiplication Patterns with Decimals

You can use patterns and place value to help you place the decimal point.

To multiply a number by a power of 10, you can use the exponent to determine how the position of the decimal point changes in the product.

	Exponent	Move decimal point:
$10^0 \times 5.18 = \underline{5.18}$	0	0 places to the right
$10^1 \times 5.18 = \underline{51.8}$	1	1 place to the right
$10^2 \times 5.18 = \underline{518}$	2	2 places to the right
$10^3 \times 5.18 = \underline{5,180}$	3	3 places to the right

You can use place-value patterns to find the product of a number and the decimals 0.1 and 0.01.

	Multiply by:	Move decimal point:
$1 \times 2,457 = \underline{2,457}$	1	0 places to the left
$0.1 \times 2,457 = \underline{245.7}$	0.1	1 place to the left
$0.01 \times 2,457 = \underline{24.57}$	0.01	2 places to the left

Complete the pattern.

1. $10^0 \times 25.89 = \underline{\hspace{2cm}}$

2. $1 \times 182 = \underline{\hspace{2cm}}$

$10^1 \times 25.89 = \underline{\hspace{2cm}}$

$0.1 \times 182 = \underline{\hspace{2cm}}$

$10^2 \times 25.89 = \underline{\hspace{2cm}}$

$0.01 \times 182 = \underline{\hspace{2cm}}$

$10^3 \times 25.89 = \underline{\hspace{2cm}}$

Multiplication Patterns with Decimals

Complete the pattern.

1. $2.07 \times 1 = \underline{2.07}$

2. $1 \times 30 = \underline{\hspace{2cm}}$

3. $10^0 \times 0.23 = \underline{\hspace{2cm}}$

$2.07 \times 10 = \underline{20.7}$

$0.1 \times 30 = \underline{\hspace{2cm}}$

$10^1 \times 0.23 = \underline{\hspace{2cm}}$

$2.07 \times 100 = \underline{207}$

$0.01 \times 30 = \underline{\hspace{2cm}}$

$10^2 \times 0.23 = \underline{\hspace{2cm}}$

$2.07 \times 1,000 = \underline{2,070}$

$10^3 \times 0.23 = \underline{\hspace{2cm}}$

4. $390 \times 1 = \underline{\hspace{2cm}}$

5. $10^0 \times 49.32 = \underline{\hspace{2cm}}$

6. $1 \times 9,670 = \underline{\hspace{2cm}}$

$390 \times 0.1 = \underline{\hspace{2cm}}$

$10^1 \times 49.32 = \underline{\hspace{2cm}}$

$0.1 \times 9,670 = \underline{\hspace{2cm}}$

$390 \times 0.01 = \underline{\hspace{2cm}}$

$10^2 \times 49.32 = \underline{\hspace{2cm}}$

$0.01 \times 9,670 = \underline{\hspace{2cm}}$

$10^3 \times 49.32 = \underline{\hspace{2cm}}$

7. $874 \times 1 = \underline{\hspace{2cm}}$

8. $10^0 \times 10 = \underline{\hspace{2cm}}$

9. $1 \times 5 = \underline{\hspace{2cm}}$

$874 \times 10 = \underline{\hspace{2cm}}$

$10^1 \times 10 = \underline{\hspace{2cm}}$

$0.1 \times 5 = \underline{\hspace{2cm}}$

$874 \times 100 = \underline{\hspace{2cm}}$

$10^2 \times 10 = \underline{\hspace{2cm}}$

$0.01 \times 5 = \underline{\hspace{2cm}}$

$874 \times 1,000 = \underline{\hspace{2cm}}$

$10^3 \times 10 = \underline{\hspace{2cm}}$

Problem Solving**REAL WORLD**

10. Nathan plants equal-sized squares of sod in his front yard. Each square has an area of 6 square feet. Nathan plants a total of 1,000 squares in his yard. What is the total area of the squares of sod?

11. Three friends are selling items at a bake sale. May makes \$23.25 selling bread. Inez sells gift baskets and makes 100 times as much as May. Carolyn sells pies and makes one tenth of the money Inez makes. How much money does each friend make?

Algebra • Division Patterns with Decimals

To divide a number by 10, 100, or 1,000, use the number of zeros in the divisor to determine how the position of the decimal point changes in the quotient.

	Number of zeros:	Move decimal point:
$147 \div 1 = \underline{147}$	0	0 places to the left
$147 \div 10 = \underline{14.7}$	1	1 place to the left
$147 \div 100 = \underline{1.47}$	2	2 places to the left
$147 \div 1,000 = \underline{0.147}$	3	3 places to the left

To divide a number by a power of 10, you can use the exponent to determine how the position of the decimal point changes in the quotient.

	Exponent	Move decimal point:
$97.2 \div 10^0 = \underline{97.2}$	0	0 places to the left
$97.2 \div 10^1 = \underline{9.72}$	1	1 place to the left
$97.2 \div 10^2 = \underline{0.972}$	2	2 places to the left

Complete the pattern.

- | | | |
|--|--|--|
| 1. $358 \div 10^0 = \underline{\hspace{2cm}}$ | 2. $102 \div 10^0 = \underline{\hspace{2cm}}$ | 3. $99.5 \div 1 = \underline{\hspace{2cm}}$ |
| $358 \div 10^1 = \underline{\hspace{2cm}}$ | $102 \div 10^1 = \underline{\hspace{2cm}}$ | $99.5 \div 10 = \underline{\hspace{2cm}}$ |
| $358 \div 10^2 = \underline{\hspace{2cm}}$ | $102 \div 10^2 = \underline{\hspace{2cm}}$ | $99.5 \div 100 = \underline{\hspace{2cm}}$ |
| $358 \div 10^3 = \underline{\hspace{2cm}}$ | $102 \div 10^3 = \underline{\hspace{2cm}}$ | |

Division Patterns with Decimals

Complete the pattern.

1. $78.3 \div 1 = \underline{78.3}$

$78.3 \div 10 = \underline{7.83}$

$78.3 \div 100 = \underline{0.783}$

2. $179 \div 10^0 = \underline{\hspace{2cm}}$

$179 \div 10^1 = \underline{\hspace{2cm}}$

$179 \div 10^2 = \underline{\hspace{2cm}}$

$179 \div 10^3 = \underline{\hspace{2cm}}$

3. $87.5 \div 10^0 = \underline{\hspace{2cm}}$

$87.5 \div 10^1 = \underline{\hspace{2cm}}$

$87.5 \div 10^2 = \underline{\hspace{2cm}}$

4. $124 \div 1 = \underline{\hspace{2cm}}$

$124 \div 10 = \underline{\hspace{2cm}}$

$124 \div 100 = \underline{\hspace{2cm}}$

$124 \div 1,000 = \underline{\hspace{2cm}}$

5. $18 \div 1 = \underline{\hspace{2cm}}$

$18 \div 10 = \underline{\hspace{2cm}}$

$18 \div 100 = \underline{\hspace{2cm}}$

$18 \div 1,000 = \underline{\hspace{2cm}}$

6. $23 \div 10^0 = \underline{\hspace{2cm}}$

$23 \div 10^1 = \underline{\hspace{2cm}}$

$23 \div 10^2 = \underline{\hspace{2cm}}$

$23 \div 10^3 = \underline{\hspace{2cm}}$

7. $51.8 \div 1 = \underline{\hspace{2cm}}$

$51.8 \div 10 = \underline{\hspace{2cm}}$

$51.8 \div 100 = \underline{\hspace{2cm}}$

8. $49.3 \div 10^0 = \underline{\hspace{2cm}}$

$49.3 \div 10^1 = \underline{\hspace{2cm}}$

$49.3 \div 10^2 = \underline{\hspace{2cm}}$

9. $32.4 \div 10^0 = \underline{\hspace{2cm}}$

$32.4 \div 10^1 = \underline{\hspace{2cm}}$

$32.4 \div 10^2 = \underline{\hspace{2cm}}$

Problem Solving 

10. The local café uses 510 cups of mixed vegetables to make 1,000 quarts of beef barley soup. Each quart of soup contains the same amount of vegetables. How many cups of vegetables are in each quart of soup?
- _____

11. The same café uses 18.5 cups of flour to make 100 servings of pancakes. How many cups of flour are in one serving of pancakes?
- _____

Name _____

Place Value of Decimals

You can use a place-value chart to find the value of each digit in a decimal.
Write whole numbers to the left of the decimal point.
Write decimals to the right of the decimal point.

Ones	Tenths	Hundredths	Thousandths
3	• 8	4	7
3×1	• $8 \times \frac{1}{10}$	$4 \times \frac{1}{100}$	$7 \times \frac{1}{1,000}$
3.0	• 0.8	0.04	0.007

Value

The place value of the digit 8 in 3.847 is tenths.

The value of 8 in 3.847 is $8 \times \frac{1}{10}$, or 0.8.

You can write a decimal in different forms.

Standard Form: 3.847

Expanded Form: 3 $\times 1$ + 8 $\times \frac{1}{10}$ + 4 $\times (\frac{1}{100})$ + 7 $\times (\frac{1}{1,000})$

When you write the decimal in word form, write “and” for the decimal point.

Word Form: three and eight hundred forty-seven thousandths

1. Complete the place-value chart to find the value of each digit.

Ones	Tenths	Hundredths	Thousandths
2	• 6	9	5
2×1	•	$9 \times \frac{1}{100}$	
	0.6		

Value

Write the value of the underlined digit.

2. 0.792

3. 4.691

4. 3.805

Place Value of Decimals

Write the value of the underlined digit.

1. $0.\underline{2}87$

2. $5.\underline{3}49$

3. $2.70\underline{4}$

8 hundredths, or 0.08

4. $9.\underline{1}54$

5. $4.00\underline{6}$

6. $7.25\underline{8}$

7. $0.1\underline{9}8$

8. $6.\underline{8}21$

9. $8.02\underline{7}$

Write the number in two other forms.

10. 0.326

11. 8.517

12. 0.924

13. 1.075

Problem Solving

14. In a gymnastics competition, Paige's score was 37.025. What is Paige's score written in word form?

15. Jake's batting average for the softball season is 0.368. What is Jake's batting average written in expanded form?

Name _____

Compare and Order Decimals

You can use a place-value chart to compare decimals.

Compare. Write $<$, $>$, or $=$.

4.375 ○ 4.382

Write both numbers in a place-value chart. Then compare the digits, starting with the highest place value. Stop when the digits are different and compare.

Ones	Tenths	Hundredths	Thousandths
4	• 3	7	5
4	• 3	8	2

↑ ↑ ↑
 The ones digits are the same. The tenths digits are the same. The hundredths digits are different.

The digits are different in the hundredths place.

Since 7 hundredths $<$ 8 hundredths, 4.375 $<$ 4.382.

1. Use the place-value chart to compare the two numbers. What is the greatest place-value position where the digits differ?

Ones	Tenths	Hundredths	Thousandths
2	• 8	6	5
2	• 8	6	1

Compare. Write $<$, $>$, or $=$.

2. 5.37 ○ 5.370

3. 9.425 ○ 9.417

4. 7.684 ○ 7.689

Name the greatest place-value position where the digits differ.

Name the greater number.

5. 8.675; 8.654

6. 3.086; 3.194

7. 6.243; 6.247

Order from least to greatest.

8. 5.04; 5.4; 5.406; 5.064

9. 2.614; 2.146; 2.46; 2.164

Compare and Order DecimalsCompare. Write $<$, $>$, or $=$.

1. $4.735 \text{ } \textcircled{<} \text{ } 4.74$

2. $2.549 \text{ } \textcircled{\quad} \text{ } 2.549$

3. $3.207 \text{ } \textcircled{\quad} \text{ } 3.027$

4. $8.25 \text{ } \textcircled{\quad} \text{ } 8.250$

5. $5.871 \text{ } \textcircled{\quad} \text{ } 5.781$

6. $9.36 \text{ } \textcircled{\quad} \text{ } 9.359$

7. $1.538 \text{ } \textcircled{\quad} \text{ } 1.54$

8. $7.036 \text{ } \textcircled{\quad} \text{ } 7.035$

9. $6.700 \text{ } \textcircled{\quad} \text{ } 6.7$

Order from greatest to least.

10. 3.008; 3.825; 3.09; 3.18

11. 0.275; 0.2; 0.572; 0.725

12. 6.318; 6.32; 6.230; 6.108

13. 0.456; 1.345; 0.645; 0.654

Algebra Find the unknown digit to make each statement true.

14. $2.48 > 2.4 \text{ } \blacksquare \text{ } 1 > 2.463$

15. $5.723 < 5.72 \text{ } \blacksquare \text{ } < 5.725$

16. $7.64 < 7. \text{ } \blacksquare \text{ } 5 < 7.68$

Problem Solving

17. The completion times for three runners in a 100-yard dash are 9.75 seconds, 9.7 seconds, and 9.675 seconds. Which is the winning time?

18. In a discus competition, an athlete threw the discus 63.37 meters, 62.95 meters, and 63.7 meters. Order the distances from least to greatest.

Round Decimals

Rounding decimals is similar to rounding whole numbers.

Round 4.682 to the nearest tenth.

Step 1 Write 4.682 in a place-value chart.

Ones	Tenths	Hundredths	Thousandths
4	6	<u>8</u>	2

Step 2 Find the digit in the place to which you want to round. Circle that digit.

The digit 6 is in the tenths place, so circle it.

Step 3 Underline the digit to the right of the circled digit.

The digit 8 is to the right of the circled digit, so underline it.

Step 4 If the underlined digit is less than 5, the circled digit stays the same. If the underlined digit is 5 or greater, round up the circled digit.

8 > 5, so round 6 up to 7.

Step 5 After you round the circled digit, drop the digits to the right of the circled digit.

So, 4.682 rounded to the nearest tenth is 4.7.

Write the place value of the underlined digit. Round each number to the place of the underlined digit.

1. 0.392

2. 5.714

3. 16.908

Name the place value to which each number was rounded.

4. 0.825 to 0.83

5. 3.815 to 4

6. 1.546 to 1.5

Round Decimals

Write the place value of the underlined digit. Round each number to the place of the underlined digit.

1. 0.782

tenths

0.8

2. 4.735

3. 2.348

4. 0.506

5. 15.186

6. 8.465

Name the place value to which each number was rounded.

7. 0.546 to 0.55

8. 4.805 to 4.8

9. 6.493 to 6

10. 1.974 to 2.0

11. 7.709 to 8

12. 14.637 to 15

Round 7.954 to the place named.

13. tenths

14. hundredths

15. ones

Round 18.194 to the place named.

16. tenths

17. hundredths

18. ones

Problem Solving 

19. The population density of Montana is 6.699 people per square mile. What is the population density per square mile of Montana rounded to the nearest whole number?

20. Alex's batting average is 0.346. What is his batting average rounded to the nearest hundredth?

Multiply by 1-Digit Numbers

You can use place value to help you multiply by 1-digit numbers.

Estimate. Then find the product. 378×6

Estimate: $400 \times 6 = 2,400$

Step 1 Multiply the ones.

Thousands	Hundreds	Tens	Ones
	3	⁴ 7	8
			6
×			8

Step 2 Multiply the tens.

Thousands	Hundreds	Tens	Ones
	43	⁴ 7	8
			6
×			8

Step 3 Multiply the hundreds.

Thousands	Hundreds	Tens	Ones
	43	⁴ 7	8
			6
2,	2	6	8

So, $378 \times 6 = 2,268$.

Complete to find the product.

1. 7×472

Estimate: $7 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

Multiply the ones.

$$\begin{array}{r} 472 \\ \times 7 \\ \hline \end{array}$$

Multiply the tens.

$$\begin{array}{r} ^1 72 \\ \times 7 \\ \hline \end{array}$$

Multiply the hundreds.

$$\begin{array}{r} ^{51} 2 \\ \times 7 \\ \hline \end{array}$$

Estimate. Then find the product.

2. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 863 \\ \times 8 \\ \hline \end{array}$$

3. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 809 \\ \times 8 \\ \hline \end{array}$$

4. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 932 \\ \times 7 \\ \hline \end{array}$$

5. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 2,767 \\ \times 7 \\ \hline \end{array}$$

Multiply by 1-Digit Numbers

Estimate. Then find the product.

1. Estimate: 3,600

$$\begin{array}{r} 15 \\ 416 \\ \times 9 \\ \hline 3,744 \end{array}$$

2. Estimate: _____

$$\begin{array}{r} 1,374 \\ \times 6 \\ \hline \end{array}$$

3. Estimate: _____

$$\begin{array}{r} 726 \\ \times 5 \\ \hline \end{array}$$

4. Estimate: _____

$$\begin{array}{r} 872 \\ \times 3 \\ \hline \end{array}$$

5. Estimate: _____

$$\begin{array}{r} 2,308 \\ \times 9 \\ \hline \end{array}$$

6. Estimate: _____

$$\begin{array}{r} 1,564 \\ \times 5 \\ \hline \end{array}$$

Estimate. Then find the product.

7. 4×979

8. 503×7

9. $5 \times 4,257$

10. $6,018 \times 9$

11. 758×6

12. 3×697

13. $2,141 \times 8$

14. $7 \times 7,956$

Problem Solving

15. Mr. and Mrs. Dorsey and their three children are flying to Springfield. The cost of each ticket is \$179. Estimate how much the tickets will cost. Then find the exact cost of the tickets.

16. Ms. Tao flies roundtrip twice yearly between Jacksonville and Los Angeles on business. The distance between the two cities is 2,150 miles. Estimate the distance she flies for both trips. Then find the exact distance.

Multiply by 2-Digit Numbers

You can use place value and regrouping to multiply.

Find 29×63 .

Step 1 Write the problem vertically.
Multiply by the ones.

$$\begin{array}{r} \\ 63 \\ \times 29 \\ \hline 567 \end{array} \leftarrow 63 \times 9 = (\underline{60} \times 9) + (\underline{3} \times 9) \\ = \underline{540} + \underline{27}, \text{ or } \underline{567}$$

Step 2 Multiply by the tens.

$$\begin{array}{r} \\ 63 \\ \times 29 \\ \hline 1260 \end{array} \leftarrow 63 \times 20 = (\underline{60} \times 20) + (\underline{3} \times 20) \\ = \underline{1,200} + \underline{60}, \text{ or } \underline{1,260}$$

Step 3 Add the partial products.

$$\begin{array}{r} 63 \\ \times 29 \\ \hline 567 \\ + 1260 \\ \hline 1,827 \end{array}$$

So, $63 \times 29 = 1,827$.

Complete to find the product.

1.
$$\begin{array}{r} 57 \\ \times 14 \\ \hline \end{array}$$

$\leftarrow 57 \times \underline{\quad}$

$\leftarrow 57 \times \underline{\quad}$

2.
$$\begin{array}{r} 76 \\ \times 45 \\ \hline \end{array}$$

$\leftarrow 76 \times \underline{\quad}$

$\leftarrow 76 \times \underline{\quad}$

3.
$$\begin{array}{r} 139 \\ \times 12 \\ \hline \end{array}$$

$\leftarrow 139 \times \underline{\quad}$

$\leftarrow 139 \times \underline{\quad}$

4. Find 26×69 . Estimate first.

$$\begin{array}{r} 69 \\ \times 26 \\ \hline \end{array}$$

Estimate: _____

Multiply by 2-Digit Numbers

Estimate. Then find the product.

1. Estimate: 4,000

$$\begin{array}{r} 82 \\ \times 49 \\ \hline 738 \\ + 3280 \\ \hline 4,018 \end{array}$$

2. Estimate: _____

$$\begin{array}{r} 92 \\ \times 68 \\ \hline \end{array}$$

3. Estimate: _____

$$\begin{array}{r} 396 \\ \times 37 \\ \hline \end{array}$$

4. 23×67

5. 86×33

6. 78×71

7. 309×29

8. 612×87

9. 476×72

Problem Solving 

10. A company shipped 48 boxes of canned dog food. Each box contains 24 cans. How many cans of dog food did the company ship in all?

11. There were 135 cars in a rally. Each driver paid a \$25 fee to participate in the rally. How much money did the drivers pay in all?

Algebra • Properties

Properties of operations are characteristics of the operations that are always true.

Property	Examples
Commutative Property of Addition or Multiplication	Addition: $3 + 4 = 4 + 3$ Multiplication: $8 \times 2 = 2 \times 8$
Associative Property of Addition or Multiplication	Addition: $(1 + 2) + 3 = 1 + (2 + 3)$ Multiplication: $6 \times (7 \times 2) = (6 \times 7) \times 2$
Distributive Property	$8 \times (2 + 3) = (8 \times 2) + (8 \times 3)$
Identity Property of Addition	$9 + 0 = 9$ $0 + 3 = 3$
Identity Property of Multiplication	$54 \times 1 = 54$ $1 \times 16 = 16$

Use properties to find $37 + 24 + 43$.

$$37 + 24 + 43 = 24 + \underline{37} + 43$$

$$= 24 + (37 + 43)$$

$$= 24 + \underline{80}$$

$$= \underline{104}$$

Use the Commutative Property of Addition to reorder the addends.

Use the Associative Property of Addition to group the addends.

Use mental math to add.

Grouping 37 and 43 makes the problem easier to solve because their sum, 80, is a multiple of 10.

Use properties to find the sum or product.

1. $31 + 27 + 29$

2. $41 \times 0 \times 3$

3. $4 + (6 + 21)$

Complete the equation, and tell which property you used.

4. $(2 \times \underline{\quad}) + (2 \times 2) = 2 \times (5 + 2)$

5. $\underline{\quad} \times 1 = 15$

Properties

Use properties to find the sum or product.

1. 6×89

$$6 \times (90 - 1)$$

$$(6 \times 90) - (6 \times 1)$$

$$540 - 6$$

$$534$$

2. $93 + (68 + 7)$

3. $5 \times 23 \times 2$

4. 8×51

5. $34 + 0 + 18 + 26$

6. 6×107

Complete the equation, and tell which property you used.

7. $(3 \times 10) \times 8 = \underline{\hspace{2cm}} \times (10 \times 8)$

8. $16 + 31 = 31 + \underline{\hspace{2cm}}$

9. $0 + \underline{\hspace{2cm}} = 91$

10. $21 \times \underline{\hspace{2cm}} = 9 \times 21$

Problem Solving 

11. The Metro Theater has 20 rows of seats with 18 seats in each row. Tickets cost \$5. The theater's income in dollars if all seats are sold is $(20 \times 18) \times 5$. Use properties to find the total income.

12. The numbers of students in the four sixth-grade classes at Northside School are 26, 19, 34, and 21. Use properties to find the total number of students in the four classes.

Relate Multiplication to Division

Use the Distributive Property to find the quotient of $56 \div 4$.

Step 1

Write a related multiplication sentence for the division problem.

$$56 \div 4 = \square$$

$$4 \times \square = 56$$

Step 2

Use the Distributive Property to break apart the product into lesser numbers that are multiples of the divisor in the division problem. Use a multiple of 10 for one of the multiples.

$$(40 + 16) = 56$$

$$(4 \times 10) + (4 \times 4) = 56$$

$$4 \times (10 + 4) = 56$$

Step 3

To find the unknown factor, find the sum of the numbers inside the parentheses.

$$10 + 4 = 14$$

Step 4

Write the multiplication sentence with the unknown factor you found. Then, use the multiplication sentence to complete the division sentence.

$$4 \times 14 = 56$$

$$56 \div 4 = 14$$

Use multiplication and the Distributive Property to find the quotient.

1. $68 \div 4 =$ _____

2. $75 \div 3 =$ _____

3. $96 \div 6 =$ _____

4. $80 \div 5 =$ _____

5. $54 \div 3 =$ _____

6. $105 \div 7 =$ _____

Relate Multiplication to Division

Use multiplication and the Distributive Property to find the quotient.

1. $70 \div 5 =$ 14 2. $96 \div 6 =$ _____ 3. $85 \div 5 =$ _____

$(5 \times 10) + (5 \times 4) = 70$ _____

$5 \times 14 = 70$ _____

4. $84 \div 6 =$ _____ 5. $168 \div 7 =$ _____ 6. $104 \div 4 =$ _____

7. $171 \div 9 =$ _____ 8. $102 \div 6 =$ _____ 9. $210 \div 5 =$ _____

Problem Solving**REAL WORLD**

10. Ken is making gift bags for a party. He has 64 colored pens and wants to put the same number in each bag. How many bags will Ken make if he puts 4 pens in each bag?

11. Maritza is buying wheels for her skateboard shop. She ordered a total of 92 wheels. If wheels come in packages of 4, how many packages will she receive?

Problem Solving • Multiplication and Division

In Brett's town, there are 128 baseball players on 8 different teams. Each team has an equal number of players. How many players are on each team?

Read the Problem	Solve the Problem
<p>What do I need to find? I need to find <u>how many players are on each team in Brett's town</u>.</p> <p>What information do I need to use? There are <u>8 teams</u> with a total of <u>128 players</u>.</p> <p>How will I use the information? I can <u>divide</u> the total number of players by the number of teams. I can use a simpler problem to <u>divide</u>.</p>	<ul style="list-style-type: none"> First, I use the total number of players. <u>128 players</u> To find the number of players on each team, I will need to solve this problem. $128 \div 8 = \underline{\quad?}$ To find the quotient, I break 128 into two simpler numbers that are easier to divide. $128 \div 8 = (80 + \underline{48}) \div 8$ $= (\underline{80} \div 8) + (\underline{48} \div 8)$ $= \underline{10} + 6$ $= \underline{16}$ <p>So, there are <u>16</u> players on each team.</p>

1. Susan makes clay pots. She sells 125 pots per month to 5 stores. Each store buys the same number of pots. How many pots does each store buy?

$$125 \div 5 = (100 + \underline{\quad}) \div 5$$

$$= (100 \div 5) + (\underline{\quad} \div 5)$$

$$= \underline{\quad} + 5$$

$$= \underline{\quad}$$

2. Lou grows 112 rosemary plants. He ships an equal number of plants to customers in 8 states. How many rosemary plants does he ship to each customer?

$$112 \div 8 = (80 + \underline{\quad}) \div 8$$

$$= (\underline{\quad} \div 8) + (\underline{\quad} \div 8)$$

$$= \underline{\quad} + 4$$

$$= \underline{\quad}$$

**Problem Solving • Multiplication
and Division**

Solve the problems below. Show your work.

1. Dani is making punch for a family picnic. She adds 16 fluid ounces of orange juice, 16 fluid ounces of lemon juice, and 8 fluid ounces of lime juice to 64 fluid ounces of water. How many 8-ounce glasses of punch can she fill?

$$16 + 16 + 8 + 64 = 104 \text{ fluid ounces}$$

$$\begin{aligned} 104 \div 8 &= (40 + 64) \div 8 \\ &= (40 \div 8) + (64 \div 8) \\ &= 5 + 8, \text{ or } 13 \end{aligned}$$

13 glasses

2. Ryan has nine 14-ounce bags of popcorn to repackage and sell at the school fair. A small bag holds 3 ounces. How many small bags can he make?
-
3. Bianca is making scarves to sell. She has 33 pieces of blue fabric, 37 pieces of green fabric, and 41 pieces of red fabric. Suppose Bianca uses 3 pieces of fabric to make 1 scarf. How many scarves can she make?
-
4. Jasmine has 8 packs of candle wax to make scented candles. Each pack contains 14 ounces of wax. Jasmine uses 7 ounces of wax to make one candle. How many candles can she make?
-
5. Maurice puts 130 trading cards in protector sheets. He fills 7 sheets and puts the remaining 4 cards in an eighth sheet. Each of the filled sheets has the same number of cards. How many cards are in each filled sheet?
-

Name _____

Place the First Digit

When you divide, you can use estimation or place value to place the first digit of the quotient.

Divide.

$$6 \overline{)1,266}$$

- Estimate. $1,200 \div 6 = 200$, so the first digit of the quotient is in the hundreds place.
- Divide the hundreds.
- Divide the tens.
- Divide the ones.

So, $1,266 \div 6 = 211$.

Since 211 is close to the estimate, 200, the answer is reasonable.

$$\begin{array}{r} 211 \\ 6 \overline{)1,266} \\ \underline{-12} \\ 06 \\ \underline{-6} \\ 06 \\ \underline{-6} \\ 0 \end{array}$$

Divide.

$$8,895 \div 8$$

- Use place value to place the first digit.
- Look at the first digit.
If the first digit is less than the divisor, then the first digit of the quotient will be in the hundreds place.
If the first digit is greater than or equal to the divisor, then the first digit of the quotient will be in the thousands place.
- Since 8 thousands can be shared among 8 groups, the first digit of the quotient will be in the thousands place. Now divide.

So, $8,895 \div 8$ is 1,111 r7.

$$\begin{array}{r} 1,111 \text{ r}7 \\ 8 \overline{)8,895} \\ \underline{-8} \\ 08 \\ \underline{-8} \\ 09 \\ \underline{-8} \\ 15 \\ \underline{-8} \\ 7 \end{array}$$

Divide.

1. $3 \overline{)627}$

2. $5 \overline{)7,433}$

3. $4 \overline{)5,367}$

4. $9 \overline{)6,470}$

5. $8 \overline{)2,869}$

6. $6 \overline{)1,299}$

7. $4 \overline{)893}$

8. $7 \overline{)4,418}$

Place the First Digit

Divide.

1. $4 \overline{)388}$

2. $4 \overline{)457}$

3. $8 \overline{)712}$

4. $9 \overline{)204}$

$$\begin{array}{r}
 97 \\
 4 \overline{) 388} \\
 \underline{-36} \\
 28 \\
 \underline{-28} \\
 0
 \end{array}$$

97

5. $2,117 \div 3$

6. $520 \div 8$

7. $1,812 \div 4$

8. $3,476 \div 6$

Problem Solving 

9. The school theater department made \$2,142 on ticket sales for the three nights of their play. The department sold the same number of tickets each night and each ticket cost \$7. How many tickets did the theater department sell each night?

10. Andreus made \$625 mowing yards. He worked for 5 consecutive days and earned the same amount of money each day. How much money did Andreus earn per day?

Name _____

Divide by 1-Digit Divisors

You can use compatible numbers to help you place the first digit in the quotient. Then you can divide and check your answer.

Divide. $4\overline{)757}$

Step 1 Estimate with compatible numbers to decide where to place the first digit.

$$757 \div 4$$

↓

$$800 \div 4 = 200$$

The first digit of the quotient is in the hundreds place.

Step 2 Divide.

$$\begin{array}{r} 189 \text{ r}1 \\ 4\overline{)757} \\ \underline{-4} \\ 35 \\ \underline{-32} \\ 37 \\ \underline{-36} \\ 1 \end{array}$$

Step 3 Check your answer.

$$\begin{array}{r} 189 \leftarrow \text{quotient} \\ \times 4 \leftarrow \text{divisor} \\ \hline 756 \\ + 1 \leftarrow \text{remainder} \\ \hline 757 \leftarrow \text{dividend} \end{array}$$

Since 189 is close to the estimate of 200, the answer is reasonable.

So, $757 \div 4$ is 189 r1.

Divide. Check your answer.

1. $8\overline{)136}$

2. $7\overline{)297}$

3. $5\overline{)8,126}$

4. $7\overline{)4,973}$

5. $3\overline{)741}$

6. $7\overline{)456}$

Divide by 1-Digit Divisors

Divide.

1. $4 \overline{)724}$

2. $5 \overline{)312}$

3. $278 \div 2$

4. $336 \div 7$

$$\begin{array}{r}
 181 \\
 4 \overline{)724} \\
 \underline{-4} \\
 32 \\
 \underline{-32} \\
 04 \\
 \underline{-4} \\
 0
 \end{array}$$

181

Find the value of n in each equation. Write what n represents in the related division problem.

5. $n = 3 \times 45$

6. $643 = 4 \times 160 + n$

7. $n = 6 \times 35 + 4$

Problem Solving

8. Randy has 128 ounces of dog food. He feeds his dog 8 ounces of food each day. How many days will the dog food last?

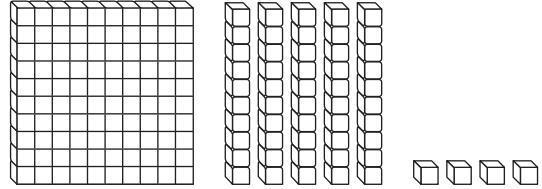
9. Angelina bought a 64-ounce can of lemonade mix. She uses 4 ounces of mix for each pitcher of lemonade. How many pitchers of lemonade can Angelina make from the can of mix?

Division with 2-Digit Divisors

You can use base-ten blocks to model division with 2-digit divisors.

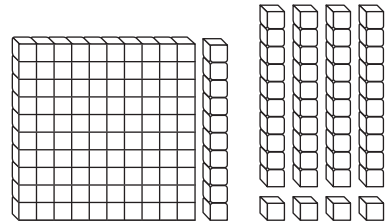
Divide. $154 \div 11$

Step 1 Model 154 with base-ten blocks.



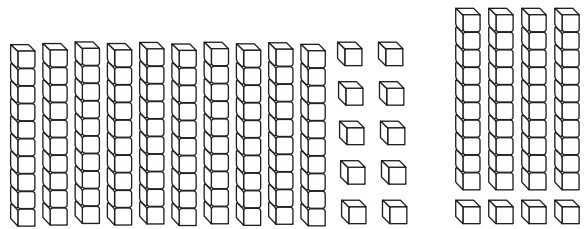
Step 2 Make equal groups of 11. Each group should contain 1 ten and 1 one.

You can make 4 groups of 11 without regrouping.



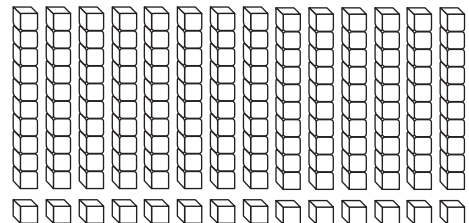
Step 3 Regroup 1 hundred as 10 tens.

Regroup 1 ten as 10 ones.



Step 4 Use the regrouped blocks to make as many groups of 11 as possible. Then count the total number of groups.

There are 14 groups. So, $154 \div 11 = \underline{14}$.



Divide. Use base-ten blocks.

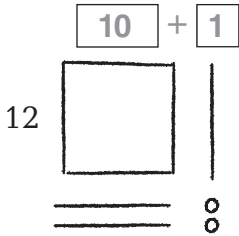
1. $192 \div 12$ _____

2. $182 \div 14$ _____

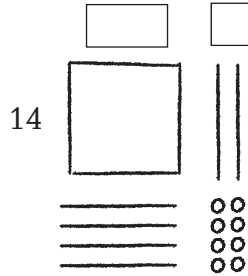
Division with 2-Digit Divisors

Use the quick picture to divide.

1. $132 \div 12 = \underline{11}$



2. $168 \div 14 = \underline{\quad}$



Divide. Use base-ten blocks.

3. $195 \div 13 = \underline{\quad}$

4. $143 \div 11 = \underline{\quad}$

5. $165 \div 15 = \underline{\quad}$

Divide. Draw a quick picture.

6. $192 \div 16 = \underline{\quad}$

7. $169 \div 13 = \underline{\quad}$

Problem Solving 

8. There are 182 seats in a theater. The seats are evenly divided into 13 rows. How many seats are in each row?

9. There are 156 students at summer camp. The camp has 13 cabins. An equal number of students sleep in each cabin. How many students sleep in each cabin?

Partial Quotients

Divide. Use partial quotients.

$858 \div 57$

Step 1 Estimate the number of groups of 57 that are in 858. You know $57 \times 10 = 570$. Since $570 < 858$, at least 10 groups of 57 are in 858. Write 10 in the quotient column, because 10 groups of the divisor, 57, are in the dividend, 858.

858	Quotient
<u>-570</u>	10
288	

Step 2 Now estimate the number of groups of 57 that are in 288. You know $57 \times 4 = 240$. So at least 4 groups of 57 are in 288. Subtract 228 from 288, because $57 \times 4 = 228$. Write 4 in the quotient column, because 4 groups of the divisor, 57, are in 288.

288	4
<u>-228</u>	
60	

Step 3 Identify the number of groups of 57 that are in 60. $57 \times 1 = 57$, so there is 1 group of 57 in 60. Write 1 in the quotient column.

remainder →	60	+ 1
	<u>-57</u>	15
	3	

Step 4 Find the total number of groups of the divisor, 57, that are in the dividend, 858, by adding the numbers in the quotient column. Include the remainder in your answer.

Answer: 15 r3**Divide. Use partial quotients.**

1. $17 \overline{)476}$

2. $14 \overline{)365}$

3. $25 \overline{)753}$

4. $462 \div 11$

5. $1,913 \div 47$

6. $1,085 \div 32$

Partial Quotients

Divide. Use partial quotients.

$$\begin{array}{r}
 1. \quad 18 \overline{)236} \\
 18 \overline{)236} \\
 \underline{-180} \leftarrow 10 \times 18 \quad 10 \\
 56 \\
 \underline{-36} \leftarrow 2 \times 18 \quad 2 \\
 20 \\
 \underline{-18} \leftarrow 1 \times 18 \quad + 1 \\
 2 \qquad \qquad \qquad 13
 \end{array}$$

 $236 \div 18$ is 13 r2.

2. $36 \overline{)540}$

3. $27 \overline{)624}$

4. $478 \div 16$

5. $418 \div 22$

6. $625 \div 25$

7. $514 \div 28$

8. $322 \div 14$

9. $715 \div 25$

Problem Solving

10. A factory processes 1,560 ounces of olive oil per hour. The oil is packaged into 24-ounce bottles. How many bottles does the factory fill in one hour?

11. A pond at a hotel holds 4,290 gallons of water. The groundskeeper drains the pond at a rate of 78 gallons of water per hour. How long will it take to drain the pond?

Name _____

Estimate with 2-Digit Divisors

You can use *compatible numbers* to estimate quotients. Compatible numbers are numbers that are easy to compute with mentally.

To find two estimates with compatible numbers, first round the divisor. Then list multiples of the rounded divisor until you find the two multiples that are closest to the dividend. Use the one less than and the one greater than the dividend.

Use compatible numbers to find two estimates. $4,125 \div 49$

Step 1 Round the divisor to the nearest ten.

49 rounds to 50.

Step 2 List multiples of 50 until you get the two closest to the dividend, 4,125.

Some multiples of 50 are:

500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500
4,000 and 4,500 are closest to the dividend.

Step 3 Divide the compatible numbers to estimate the quotient.

$4,000 \div 50 = \underline{80}$ $4,500 \div 50 = \underline{90}$

The more reasonable estimate is $4,000 \div 50 = 80$, because 4,000 is closer to 4,125 than 4,500 is.

Use compatible numbers to find two estimates.

1. $42 \overline{)1,578}$

2. $73 \overline{)4,858}$

3. $54 \overline{)343}$

4. $4,093 \div 63$

5. $4,785 \div 79$

6. $7,459 \div 94$

Use compatible numbers to estimate the quotient.

7. $847 \div 37$

8. $6,577 \div 89$

9. $218 \div 29$

Estimate with 2-Digit Divisors

Use compatible numbers to find two estimates.

1. $18 \overline{)1,322}$

2. $17 \overline{)1,569}$

3. $27 \overline{)735}$

4. $12 \overline{)478}$

$1,200 \div 20$

$= 60$

$1,400 \div 20$

$= 70$

5. $336 \div 12$

6. $1,418 \div 22$

7. $16 \overline{)2,028}$

8. $2,242 \div 33$

Use compatible numbers to estimate the quotient.

9. $82 \overline{)5,514}$

10. $61 \overline{)5,320}$

11. $28 \overline{)776}$

12. $23 \overline{)1,624}$

Problem Solving

13. A cubic yard of topsoil weighs 4,128 pounds. About how many 50-pound bags of topsoil can you fill with one cubic yard of topsoil?

14. An electronics store places an order for 2,665 USB flash drives. One shipping box holds 36 flash drives. About how many boxes will it take to hold all the flash drives?

Name _____

Divide by 2-Digit Divisors

When you divide by a 2-digit divisor, you can use estimation to help you place the first digit in the quotient. Then you can divide.

Divide. $53 \overline{)2,369}$

Step 1 Use compatible numbers to estimate the quotient. Then use the estimate to place the first digit in the quotient.

$$\begin{array}{r} 40 \\ 50 \overline{)2,000} \end{array}$$

The first digit will be in the tens place.

Step 2 Divide the tens.

$$\begin{array}{r} 4 \\ 53 \overline{)2,369} \\ - 212 \\ \hline 24 \end{array}$$

Think:

Divide: 236 tens \div 53

Multiply: 53×4 tens = 212 tens

Subtract: 236 tens $-$ 212 tens

Compare: $24 < 53$, so the first digit of the quotient is reasonable.

Step 3 Bring down the 9 ones. Then divide the ones.

$$\begin{array}{r} 44 \text{ r}37 \\ 53 \overline{)2,369} \\ - 212 \downarrow \\ \hline 249 \\ - 212 \\ \hline 37 \end{array}$$

Think:

Divide: 249 ones \div 53

Multiply: 53×4 ones = 212 ones

Subtract: 249 ones $-$ 212 ones

Compare: $37 < 53$, so the second digit of the quotient is reasonable.

So, $2,369 \div 53$ is 44 r37.

Write the remainder to the right of the whole number part of the quotient.

Divide. Check your answer.

1. $52 \overline{)612}$

2. $63 \overline{)917}$

3. $89 \overline{)1,597}$

4. $43 \overline{)641}$

5. $27 \overline{)4,684}$

6. $64 \overline{)8,455}$

Divide by 2-Digit Divisors

Divide. Check your answer.

1. $385 \div 12$

2. $837 \div 36$

3. $1,650 \div 55$

4. $5,634 \div 18$

$$\begin{array}{r}
 32 \text{ r}1 \\
 12 \overline{)385} \\
 \underline{-36} \\
 25 \\
 \underline{-24} \\
 1
 \end{array}$$

5. $7,231 \div 24$

6. $5,309 \div 43$

7. $37 \overline{)3,774}$

8. $54 \overline{)1,099}$

9. $28 \overline{)6,440}$

10. $52 \overline{)5,256}$

11. $85 \overline{)1,955}$

12. $46 \overline{)5,624}$

Problem Solving**REAL WORLD**

13. The factory workers make 756 machine parts in 36 hours. Suppose the workers make the same number of machine parts each hour. How many machine parts do they make each hour?

14. One bag holds 12 bolts. Several bags filled with bolts are packed into a box and shipped to the factory. The box contains a total of 2,760 bolts. How many bags of bolts are in the box?

Adjust Quotients

When you divide, you can use the first digit of your estimate as the first digit of your quotient. Sometimes the first digit will be too high or too low. Then you have to adjust the quotient by increasing or decreasing the first digit.

Estimate Too High		Estimate Too Low	
Divide. $271 \div 48$ Estimate. $300 \div 50 = 6$		Divide. $2,462 \div 27$ Estimate. $2,400 \div 30 = 80$	
Try 6 ones. $\begin{array}{r} 6 \\ 48 \overline{)271} \\ - 288 \\ \hline \end{array}$ You cannot subtract 288 from 271. So, the estimate is too high.	Try 5 ones. $\begin{array}{r} 5 \text{ r}31 \\ 48 \overline{)271} \\ - 240 \\ \hline 31 \end{array}$ So, $271 \div 48$ is 5 r31.	Try 8 tens. $\begin{array}{r} 8 \\ 27 \overline{)2,462} \\ - 216 \\ \hline 30 \end{array}$ 30 is greater than the divisor. So, the estimate is too low.	Try 9 tens. $\begin{array}{r} 91 \text{ r}5 \\ 27 \overline{)2,462} \\ - 243 \\ \hline 32 \\ - 27 \\ \hline 5 \end{array}$ So, $2,462 \div 27$ is 91 r5.

Adjust the estimated digit in the quotient, if needed. Then divide.

1. $58 \overline{)1,325}^2$

2. $37 \overline{)241}^6$

3. $29 \overline{)2,276}^8$

Divide.

4. $16 \overline{)845}$

5. $24 \overline{)217}$

6. $37 \overline{)4,819}$

Adjust Quotients

Adjust the estimated digit in the quotient, if needed. Then divide.

$$\begin{array}{r} 16 \overline{)976} \\ \underline{-80} \\ 17 \end{array}$$

$$\begin{array}{r} 16 \overline{)976} \\ \underline{-96} \\ 16 \\ \underline{-16} \\ 0 \end{array}$$

$$24 \overline{)689}$$

$$65 \overline{)2,210}$$

$$38 \overline{)7,035}$$

Divide.

5. $2,961 \div 47$

6. $2,072 \div 86$

7. $1,280 \div 25$

8. $31 \overline{)1,496}$

9. $86 \overline{)6,290}$

10. $95 \overline{)4,000}$

11. $44 \overline{)2,910}$

12. $82 \overline{)4,018}$

Problem Solving 

13. A copier prints 89 copies in one minute. How long does it take the copier to print 1,958 copies?

14. Erica is saving her money to buy a dining room set that costs \$580. If she saves \$29 each month, how many months will she need to save to have enough money to buy the set?

Problem Solving • Division

Sara and Sam picked apples over the weekend. Sam picked nine times as many apples as Sara. Together, they picked 310 apples. How many apples did each person pick?

Read the Problem		
<p>What do I need to find?</p> <p>I need to find <u>the number of apples each person picked.</u></p>	<p>What information do I need to use?</p> <p>I need to know that Sam and Sara picked a total of <u>310</u> apples. I need to know that Sam picked <u>9</u> times as many apples as Sara.</p>	<p>How will I use the information?</p> <p>I can use the strategy <u>draw a diagram</u> to organize the information. I can draw and use a bar model to write the division problem that will help me find the number of apples Sam and Sara each picked.</p>
Solve the Problem		
<p>My bar model needs to have one box for the number of apples Sara picked and nine boxes for the number of apples Sam picked. I can divide the total number of apples picked by the total number of boxes.</p>		
<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Sara</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> </div> <div style="margin-left: 20px; border: 1px solid black; padding: 5px 15px; font-size: 24px;">310</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Sam</div> <div style="display: flex; gap: 5px;"> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> <div style="border: 1px solid black; padding: 5px 15px; font-size: 24px;">31</div> </div> </div> <div style="text-align: right; margin-right: 50px;"> $\begin{array}{r} 31 \\ 10 \overline{)310} \\ \underline{-30} \\ 10 \\ \underline{-10} \\ 0 \end{array}$ </div>		
<p>So, Sara picked <u>31</u> apples and Sam picked <u>279</u> apples.</p>		

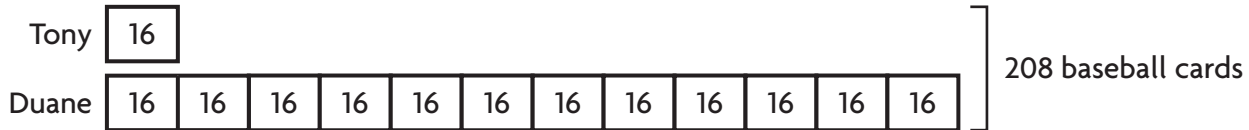
Solve each problem. To help, draw a bar model on a separate sheet of paper.

1. Kai picked 11 times as many blueberries as Nico. Together, they picked 936 blueberries. How many blueberries did each boy pick?
2. Jen wrote 10 times as many pages of a school report as Tom. They wrote 396 pages altogether. How many pages did each student write?

Problem Solving • Division

Show your work. Solve each problem.

1. Duane has 12 times as many baseball cards as Tony. Between them, they have 208 baseball cards. How many baseball cards does each boy have?



$$208 \div 13 = 16$$

Tony: 16 cards; Duane: 192 cards

2. Hallie has 10 times as many pages to read for her homework assignment as Janet. Altogether, they have to read 264 pages. How many pages does each girl have to read?

3. Hank has 48 fish in his aquarium. He has 11 times as many tetras as guppies. How many of each type of fish does Hank have?

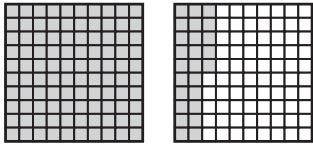
4. Kelly has 4 times as many songs on her music player as Lou. Tiffany has 6 times as many songs on her music player as Lou. Altogether, they have 682 songs on their music players. How many songs does Kelly have?

Decimal Addition

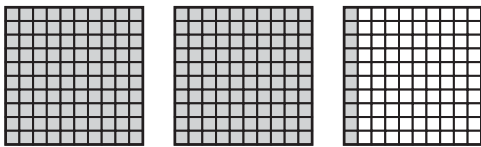
You can use decimal models to help you add decimals.

Add. $1.25 + 0.85$

Step 1 Shade squares to represent 1.25.



Step 2 Shade additional squares to represent adding 0.85.



Step 3 Count the total number of shaded squares.
There are 2 whole squares and 10 one-hundredths squares shaded. So, 2.10 wholes in all are shaded.

So, $1.25 + 0.85 = \underline{2.10}$.

Remember:
Since there are only 75 squares left in the second model, you need to add another whole model for the remaining 10 squares.

Add. Use decimal models. Draw a picture to show your work.

1. $2.1 + 0.59$

2. $1.4 + 0.22$

3. $1.27 + 1.15$

4. $0.81 + 0.43$

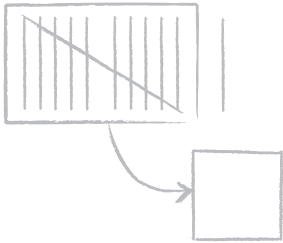
Decimal Addition

Add. Draw a quick picture.

1. $0.5 + 0.6 = \underline{1.1}$

2. $0.15 + 0.36 = \underline{\hspace{2cm}}$

3. $0.8 + 0.7 = \underline{\hspace{2cm}}$



4. $0.35 + 0.64 = \underline{\hspace{2cm}}$

5. $0.54 + 0.12 = \underline{\hspace{2cm}}$

6. $0.51 + 0.28 = \underline{\hspace{2cm}}$

7. $3.8 + 1.4 = \underline{\hspace{2cm}}$

8. $2.71 + 2.15 = \underline{\hspace{2cm}}$

9. $2.9 + 1.4 = \underline{\hspace{2cm}}$

Problem Solving**REAL WORLD**

10. Draco bought 0.6 pound of bananas and 0.9 pound of grapes at the farmers' market. What is the total weight of the fruit?

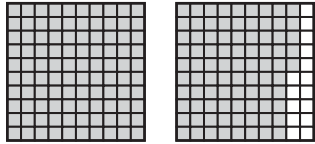
11. Nancy biked 2.65 miles in the morning and 3.19 miles in the afternoon. What total distance did she bike?

Decimal Subtraction

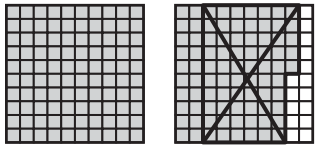
You can use decimal models to help you subtract decimals.

Subtract. $1.85 - 0.65$

Step 1 Shade squares to represent 1.85.



Step 2 Circle and cross out 65 of the shaded squares to represent subtracting 0.65.



Step 3 Count the shaded squares that are not crossed out. Altogether, 1 whole square and 20 one-hundredths squares, or 1.20 wholes, are NOT crossed out.

So, $1.85 - 0.65 = \underline{1.20}$.

Remember:

By circling and crossing out shaded squares, you can see how many squares are taken away, or subtracted.

Subtract. Use decimal models. Draw a picture to show your work.

1. $1.4 - 0.61$

2. $1.6 - 1.08$

3. $0.84 - 0.17$

4. $1.39 - 1.14$

Decimal Subtraction

Subtract. Draw a quick picture.

1. $0.7 - 0.2 = \underline{0.5}$

2. $0.45 - 0.24 = \underline{\hspace{2cm}}$

3. $0.92 - 0.51 = \underline{\hspace{2cm}}$



4. $0.67 - 0.42 = \underline{\hspace{2cm}}$

5. $0.9 - 0.2 = \underline{\hspace{2cm}}$

6. $3.25 - 1.67 = \underline{\hspace{2cm}}$

7. $4.1 - 2.7 = \underline{\hspace{2cm}}$

8. $3.12 - 2.52 = \underline{\hspace{2cm}}$

9. $3.6 - 1.8 = \underline{\hspace{2cm}}$

Problem Solving**REAL WORLD**

10. Yelina made a training plan to run 5.6 miles per day. So far, she has run 3.1 miles today. How much farther does she have to run to meet her goal for today?

11. Tim cut a 2.3-foot length of pipe from a pipe that was 4.1 feet long. How long is the remaining piece of pipe?

Name _____

Estimate Decimal Sums and Differences

You can use rounding to help you estimate sums and differences.

Use rounding to estimate $1.24 + 0.82 + 3.4$.

Round to the nearest whole number. Then add.

$$\begin{array}{r} 1.24 \rightarrow 1 \\ 0.82 \rightarrow 1 \\ + 3.4 \rightarrow + 3 \\ \hline 5 \end{array}$$

So, the sum is about 5.

Remember:

If the digit to the right of the place you are rounding to is:

- less than 5, the digit in the rounding place stays the same.
- greater than or equal to 5, the digit in the rounding place increases by 1.

Use benchmarks to estimate $8.78 - 0.30$.

$$\begin{array}{r} 8.78 \rightarrow 8.75 \\ - 0.30 \rightarrow - 0.25 \\ \hline 8.5 \end{array}$$

Think: 0.78 is between 0.75 and 1.

It is closer to 0.75.

Think: 0.30 is between 0.25 and 0.50.

It is closer to 0.25.

So, the difference is about 8.5.

Use rounding to estimate.

1.
$$\begin{array}{r} 51.23 \\ -28.4 \\ \hline \end{array}$$

2.
$$\begin{array}{r} \$29.38 \\ +\$42.75 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 7.6 \\ -2.15 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 0.74 \\ +0.20 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 2.08 \\ 0.56 \\ +0.41 \\ \hline \end{array}$$

Use benchmarks to estimate.

6.
$$\begin{array}{r} 6.17 \\ -3.5 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 1.73 \\ 1.4 \\ +3.17 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 3.28 \\ -0.86 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 15.27 \\ +41.8 \\ \hline \end{array}$$

10.
$$\begin{array}{r} \$23.07 \\ -\$ 7.83 \\ \hline \end{array}$$

11. $0.427 + 0.711$

12. $61.05 - 18.63$

13. $40.51 + 30.39$

Estimate Decimal Sums and Differences

Use rounding to estimate.

1.
$$\begin{array}{r} 5.38 \\ +6.14 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 2.57 \\ +0.14 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 9.65 \\ -3.12 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 7.92 \\ +5.37 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +6 \\ \hline 11 \end{array}$$

Use benchmarks to estimate.

5.
$$\begin{array}{r} 2.81 \\ +3.72 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 12.54 \\ + 7.98 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 6.34 \\ +3.95 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 16.18 \\ - 5.94 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 17.09 \\ + 3.98 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 14.01 \\ - 4.51 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 11.47 \\ + 9.02 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 19.97 \\ -11.02 \\ \hline \end{array}$$

Problem Solving 

13. Elian bought 1.87 pounds of chicken and 2.46 pounds of turkey at the deli. About how much meat did he buy altogether?
-
-
- _____

14. Jenna bought a gallon of milk at the store for \$3.58. About how much change did she receive from a \$20 bill?
-
-
- _____

Add Decimals

Add. $4.37 + 9.8$

Step 1 Estimate the sum.

$$\begin{array}{r}
 4.37 + 9.8 \\
 \downarrow \quad \downarrow \\
 \text{Estimate: } 4 + 10 = 14
 \end{array}$$

Step 2 Line up the place values for each number in a place-value chart. Then add.

	Ones	Tenths	Hundredths	
	4	● 3	7	
+	9	● 8		
	14	● 1	7	← sum

Step 3 Use your estimate to determine if your answer is reasonable.

Think: 14.17 is close to the estimate, 14. The answer is reasonable.

So, $4.37 + 9.8 = \underline{14.17}$.

Estimate. Then find the sum.

1. Estimate: _____

$$\begin{array}{r}
 1.20 \\
 + 0.34 \\
 \hline
 \end{array}$$

2. Estimate: _____

$$\begin{array}{r}
 1.52 \\
 + 1.21 \\
 \hline
 \end{array}$$

3. Estimate: _____

$$\begin{array}{r}
 12.25 \\
 + 11.25 \\
 \hline
 \end{array}$$

4. Estimate: _____

$$\begin{array}{r}
 10.75 \\
 + 1.11 \\
 \hline
 \end{array}$$

5. Estimate: _____

$$\begin{array}{r}
 22.65 \\
 + 18.01 \\
 \hline
 \end{array}$$

6. Estimate: _____

$$\begin{array}{r}
 34.41 \\
 + 15.37 \\
 \hline
 \end{array}$$

Add Decimals

Estimate. Then find the sum.

1. Estimate: _____

$$\begin{array}{r} 2.85 \\ +7.29 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ 2.85 \\ +7.29 \\ \hline 10.14 \end{array}$$

2. Estimate: _____

$$\begin{array}{r} 4.23 \\ +6.51 \\ \hline \end{array}$$

3. Estimate: _____

$$\begin{array}{r} 6.8 \\ +4.2 \\ \hline \end{array}$$

4. Estimate: _____

$$\begin{array}{r} 2.7 \\ +5.37 \\ \hline \end{array}$$

Find the sum.

5. $6.8 + 4.4$

6. $6.87 + 5.18$

7. $3.14 + 2.9$

8. $16.18 + 5.94$

9. $19.8 + 31.45$

10. $25.47 + 7.24$

11. $9.17 + 5.67$

12. $19.7 + 5.46$

Problem Solving

13. Marcela's dog gained 4.1 kilograms in two months. Two months ago, the dog's mass was 5.6 kilograms. What is the dog's current mass?

14. During last week's storm, 2.15 inches of rain fell on Monday and 1.68 inches of rain fell on Tuesday. What was the total amount of rainfall on both days?

Subtract Decimals

Subtract. $12.56 - 4.33$

Step 1 Estimate the difference.

$$\begin{array}{r}
 12.56 - 4.33 \\
 \downarrow \quad \downarrow \\
 \text{Estimate: } 13 - 4 = 9
 \end{array}$$

Step 2 Line up the place values for each number in a place-value chart. Then subtract.

	Ones	Tenths	Hundredths	
	12	● 5	6	
–	4	● 3	3	
	8	● 2	3	← difference

Step 3 Use your estimate to determine if your answer is reasonable.

Think: 8.23 is close to the estimate, 9. The answer is reasonable.

So, $12.56 - 4.33 = \underline{8.23}$.

Estimate. Then find the difference.

1. Estimate: _____

$$\begin{array}{r}
 1.97 \\
 - 0.79 \\
 \hline
 \end{array}$$

2. Estimate: _____

$$\begin{array}{r}
 4.42 \\
 - 1.26 \\
 \hline
 \end{array}$$

3. Estimate: _____

$$\begin{array}{r}
 10.25 \\
 - 8.25 \\
 \hline
 \end{array}$$

Find the difference. Check your answer.

4.
$$\begin{array}{r}
 5.75 \\
 - 1.11 \\
 \hline
 \end{array}$$

5.
$$\begin{array}{r}
 25.21 \\
 - 19.05 \\
 \hline
 \end{array}$$

6.
$$\begin{array}{r}
 42.14 \\
 - 25.07 \\
 \hline
 \end{array}$$

Subtract Decimals

Estimate. Then find the difference.

1. Estimate: 3

$$\begin{array}{r} 6.5 \\ -3.9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \text{ } 15 \\ \cancel{6.5} \\ -3.9 \\ \hline \end{array}$$

$$\underline{2.6}$$

2. Estimate: _____

$$\begin{array}{r} 4.23 \\ -2.51 \\ \hline \end{array}$$

3. Estimate: _____

$$\begin{array}{r} 8.6 \\ -5.1 \\ \hline \end{array}$$

4. Estimate: _____

$$\begin{array}{r} 2.71 \\ -1.34 \\ \hline \end{array}$$

Find the difference. Check your answer.

5. $\begin{array}{r} 16.3 \\ -4.4 \\ \hline \end{array}$

6. $\begin{array}{r} 12.56 \\ -5.18 \\ \hline \end{array}$

7. $\begin{array}{r} 3.14 \\ -2.9 \\ \hline \end{array}$

8. $\begin{array}{r} 34.9 \\ -4.29 \\ \hline \end{array}$

9. $2.54 - 1.67$

10. $25.8 - 14.7$

11. $11.63 - 6.7$

12. $5.24 - 2.14$

Problem Solving 

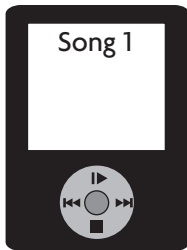
13. The width of a tree was 3.15 inches last year. This year, the width is 5.38 inches. How much did the width of the tree increase?

14. The temperature decreased from 71.5°F to 56.8°F overnight. How much did the temperature drop?

Name _____

Algebra • Patterns with Decimals

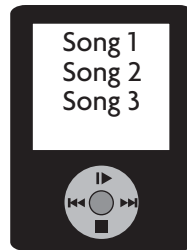
Marla wants to download some songs from the Internet. The first song costs \$1.50, and each additional song costs \$1.20. How much will 2, 3, and 4 songs cost?



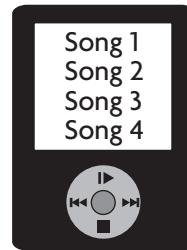
1 song
\$1.50



2 songs
?



3 songs
?



4 songs
?

Step 1 Identify the first term in the sequence.

Think: The cost of 1 song is \$1.50. The first term is \$1.50.

Step 2 Identify whether the sequence is increasing or decreasing from one term to the next.

Think: Marla will pay \$1.20 for each additional song. The sequence is increasing.

Step 3 Write a rule that describes the sequence. Start with \$1.50 and add \$1.20.

Step 4 Use your rule to find the unknown terms in the sequence.

Number of Songs	1	2	3	4
Cost	\$1.50	$1.50 + 1.20 = \$2.70$	$2.70 + 1.20 = \$3.90$	$3.90 + 1.20 = \$5.10$

So, 2 songs cost \$2.70, 3 songs cost \$3.90, and 4 songs cost \$5.10.

Write a rule for the sequence.

1. 0.4, 0.7, 1.0, 1.3, ...

2. 5.25, 5.00, 4.75, 4.50, ...

Rule: _____

Rule: _____

Write a rule for the sequence, then find the unknown term.

3. 26.1, 23.8, 21.5, _____, 16.9

4. 4.62, 5.03, _____, 5.85, 6.26

Patterns with Decimals

Write a rule for the sequence. Then find the unknown term.

1. 2.6, 3.92, 5.24, 6.56, 7.88

2. 25.7, 24.1, _____, 20.9, 19.3

Think: $2.6 + ? = 3.92$; $3.92 + ? = 5.24$

$2.6 + 1.32 = 3.92$

$3.92 + 1.32 = 5.24$

Rule: _____ **add 1.32** _____

Rule: _____

3. 14.33, 13.22, 12.11, 11.00, _____

4. 1.75, _____, 6.75, 9.25, 11.75

Rule: _____

Rule: _____

Write the first four terms of the sequence.

5. **Rule:** start at 17.3, add 0.9

6. **Rule:** start at 28.6, subtract 3.1

_____, _____, _____, _____

_____, _____, _____, _____

Problem Solving

7. The Ride-It Store rents bicycles. The cost is \$8.50 for 1 hour, \$13.65 for 2 hours, \$18.80 for 3 hours, and \$23.95 for 4 hours. If the pattern continues, how much will it cost Nate to rent a bike for 6 hours?

8. Lynne walks dogs every day to earn money. The fees she charges per month are 1 dog, \$40; 2 dogs, \$37.25 each; 3 dogs, \$34.50 each; 4 dogs, \$31.75 each. A pet store wants her to walk 8 dogs. If the pattern continues, how much will Lynne charge to walk each of the 8 dogs?

Problem Solving • Add and Subtract Money

At the end of April, Mrs. Lei had a balance of \$476.05. Since then she has written checks for \$263.18 and \$37.56, and made a deposit of \$368.00. Her checkbook balance currently shows \$498.09. Find Mrs. Lei's correct balance.

Read the Problem	Solve the Problem																																
<p>What do I need to find? I need to find <u>Mrs. Lei's correct checkbook balance</u>.</p>	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th colspan="4" style="text-align: center;">Balancing Mrs. Lei's Checkbook</th> </tr> </thead> <tbody> <tr> <td colspan="2">April balance</td> <td></td> <td style="text-align: right;">\$476.05</td> </tr> <tr> <td>Deposit</td> <td></td> <td style="text-align: right;">\$368.00</td> <td style="text-align: right;">+\$368.00</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;">\$844.05</td> </tr> <tr> <td>Check</td> <td style="text-align: right;">\$263.18</td> <td></td> <td style="text-align: right;">-\$263.18</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;">\$580.87</td> </tr> <tr> <td>Check</td> <td style="text-align: right;">\$37.56</td> <td></td> <td style="text-align: right;">-\$37.56</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;">\$543.31</td> </tr> </tbody> </table> <p>Mrs. Lei's correct balance is <u style="text-align: center;">\$543.31</u></p>	Balancing Mrs. Lei's Checkbook				April balance			\$476.05	Deposit		\$368.00	+\$368.00				\$844.05	Check	\$263.18		-\$263.18				\$580.87	Check	\$37.56		-\$37.56				\$543.31
Balancing Mrs. Lei's Checkbook																																	
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			\$580.87																														
Check	\$37.56		-\$37.56																														
			\$543.31																														
<p>What information do I need to use? I need to use the <u>April balance, and the check and deposit amounts</u>.</p>																																	
<p>How will I use the information? I need to make a table and use the information to <u>subtract the checks and add the deposit to find the correct balance</u>.</p>																																	

- 1.** At the end of June, Mr. Kent had a balance of \$375.98. Since then he has written a check for \$38.56 and made a deposit of \$408.00. His checkbook shows a balance of \$645.42. Find Mr. Kent's correct balance.

- 2.** Jordan buys a notebook for himself and each of 4 friends. Each notebook costs \$1.85. Make a table to find the cost of 5 notebooks.

Problem Solving • Add and Subtract Money

Solve. Use the table to solve 1–3.

1. Dorian and Jack decided to go bowling. They each need to rent shoes and 1 lane, and Jack is a member. If Jack pays for both of them with \$20, what change should he receive?

Bowl-a-Rama		
	Regular Cost	Member's Cost
Lane Rental (up to 4 people)	\$9.75	\$7.50
Shoe Rental	\$3.95	\$2.95

Calculate the cost: $\$7.50 + \$3.95 + \$2.95 = \14.40

Calculate the change: $\$20 - \$14.40 = \$5.60$

2. Natalie and her friends decided to rent 4 lanes at regular cost for a party. Ten people need to rent shoes, and 4 people are members. What is the total cost for the party?

3. Warren paid \$23.85 and received no change. He is a member and rented 2 lanes. How many pairs of shoes did he rent?

Use the following information to solve 4–6.

At the concession stand, medium sodas cost \$1.25 and hot dogs cost \$2.50.

4. Natalie's group brought in pizzas, but is buying the drinks at the concession stand. How many medium sodas can Natalie's group buy with \$20? Make a table to show your answer.

5. Jack bought 2 medium sodas and 2 hot dogs. He paid with \$20. What was his change?

6. How much would it cost to buy 3 medium sodas and 2 hot dogs?

Choose a Method

There is more than one way to find the sums and differences of whole numbers and decimals. You can use properties, mental math, place value, a calculator, or paper and pencil.

Choose a method. Find the sum or difference.

- Use mental math for problems with fewer digits or rounded numbers.

$$\begin{array}{r} 2.86 \\ - 1.2 \\ \hline 1.66 \end{array}$$

- Use place value for larger numbers.

$$\begin{array}{r} \overset{1}{\$}15.79 \\ + \overset{1}{\$}32.81 \\ \hline \$48.60 \end{array}$$

- Use a calculator for difficult numbers or very large numbers.

$$\boxed{3} \boxed{8} \boxed{.} \boxed{4} \boxed{4} \boxed{-} \boxed{2} \boxed{5} \boxed{.} \boxed{8} \boxed{6} \boxed{=} \boxed{12.58}$$

Find the sum or difference.

1. $\begin{array}{r} 73.9 \\ + 4.37 \\ \hline \end{array}$

2. $\begin{array}{r} 127.35 \\ + 928.52 \\ \hline \end{array}$

3. $\begin{array}{r} 10 \\ + 2.25 \\ \hline \end{array}$

4. $\begin{array}{r} 0.36 \\ + 1.55 \\ \hline \end{array}$

5. $\begin{array}{r} 71.4 \\ + 11.5 \\ \hline \end{array}$

6. $\begin{array}{r} 90.4 \\ + 88.76 \\ \hline \end{array}$

7. $\begin{array}{r} 3.3 \\ + 5.6 \\ \hline \end{array}$

8. $\begin{array}{r} 14.21 \\ 1.79 \\ + 15.88 \\ \hline \end{array}$

9. $68.20 - 42.10$

10. $2.25 - 1.15$

11. $875.33 - 467.79$

12. $97.26 - 54.90$

Name _____

Lesson 37

CC.5.NBT.7

Choose a Method

Find the sum or difference.

1.
$$\begin{array}{r} 7.24 \\ +3.18 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 5.2 \\ 6.47 \\ +12.16 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 6.37 \\ -4.98 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 0.64 \\ 9.68 \\ +1.47 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ 7.24 \\ +3.18 \\ \hline \end{array}$$

10.42

5.
$$\begin{array}{r} 14.87 \\ +3.65 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 60.12 \\ -14.05 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 2.72 \\ +9.48 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 16.85 \\ +83.4 \\ \hline \end{array}$$

9. $\$13.60 - \8.74 _____

10. $\$25.00 - \16.32 _____

11. $13.65 + 6.90 + 4.35$ _____

Problem Solving



12. Jill bought 6.5 meters of blue lace and 4.12 meters of green lace. What was the total length of lace she bought?

13. Zack bought a coat for \$69.78. He paid with a \$100 bill and received \$26.73 in change. How much was the sales tax?

Multiply Decimals and Whole Numbers

You can draw a quick picture to help multiply a decimal and a whole number.

Find the product. 4×0.23

Draw a quick picture. Each bar represents one tenth, or 0.1.
Each circle represents one hundredth, or 0.01.

Step 1

Draw 4 groups of 2 tenths and 3 hundredths.



So, $4 \times 0.23 = \underline{0.92}$.

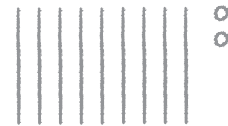
Step 2

Combine the tenths. Then combine the hundredths.



Step 3

There are 12 hundredths. Rename 10 hundredths as 1 tenth. Then you will have 9 tenths and 2 hundredths.



Find the product. Use a quick picture.

1. $2 \times 0.19 = \underline{\hspace{2cm}}$

2. $3 \times 0.54 = \underline{\hspace{2cm}}$

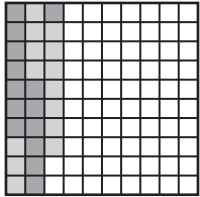
3. $4 \times 0.07 = \underline{\hspace{2cm}}$

4. $3 \times 1.22 = \underline{\hspace{2cm}}$

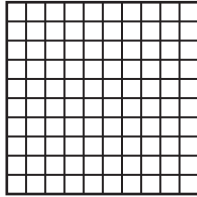
Multiply Decimals and Whole Numbers

Use the decimal model to find the product.

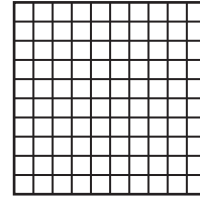
1. $4 \times 0.07 = \underline{0.28}$



2. $3 \times 0.27 = \underline{\hspace{2cm}}$



3. $2 \times 0.45 = \underline{\hspace{2cm}}$



Find the product. Draw a quick picture.

4. $2 \times 0.8 = \underline{\hspace{2cm}}$

5. $3 \times 0.33 = \underline{\hspace{2cm}}$

6. $5 \times 0.71 = \underline{\hspace{2cm}}$

7. $4 \times 0.23 = \underline{\hspace{2cm}}$

Problem Solving 

8. In physical education class, Sonia walks a distance of 0.12 mile in 1 minute. At that rate, how far can she walk in 9 minutes?

9. A certain tree can grow 0.45 meter in one year. At that rate, how much can the tree grow in 3 years?

Multiplication with Decimals and Whole Numbers

To find the product of a one-digit whole number and a decimal, multiply as you would multiply whole numbers. To find the number of decimal places in the product, add the number of decimal places in the factors.

To multiply 6×4.25 , multiply as you would multiply 6×425 .

Step 1

Multiply the ones.

$$\begin{array}{r} ^3 \\ 425 \\ \times 6 \\ \hline 0 \end{array}$$

So, $6 \times 4.25 = \underline{25.50}$.

Step 2

Multiply the tens.

$$\begin{array}{r} ^{13} \\ 425 \\ \times 6 \\ \hline 50 \end{array}$$

Step 3

Multiply the hundreds. Then place the decimal point in the product.

$$\begin{array}{r} ^{13} \\ 4.25 \leftarrow \mathbf{2 \text{ decimal places}} \\ \times 6 \leftarrow \mathbf{+ 0 \text{ decimal places}} \\ \hline 25.50 \leftarrow \mathbf{2 \text{ decimal places}} \end{array}$$

Place the decimal point in the product.

1. 8.23 **Think:** The place value of the decimal factor is hundredths.

$$\begin{array}{r} \\ 49.38 \\ \times 6 \\ \hline 0 \end{array}$$

2. 6.3

$$\begin{array}{r} \\ 252 \\ \times 4 \\ \hline 0 \end{array}$$

3. 16.82

$$\begin{array}{r} \\ 8410 \\ \times 5 \\ \hline 0 \end{array}$$

Find the product.

4. 5.19

$$\begin{array}{r} \\ \\ \times 3 \\ \hline 0 \end{array}$$

5. 7.2

$$\begin{array}{r} \\ \\ \times 8 \\ \hline 0 \end{array}$$

6. 37.46

$$\begin{array}{r} \\ \\ \times 7 \\ \hline 0 \end{array}$$

Multiplication with Decimals and Whole Numbers

Find the product.

$$\begin{array}{r} 1. \quad 2.7 \\ \times \quad 4 \\ \hline 10.8 \end{array}$$

Think: The place value of the decimal factor is tenths.

$$\begin{array}{r} 2. \quad 7.6 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 0.35 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 8.42 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 14.05 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 23.82 \\ \times \quad 5 \\ \hline \end{array}$$

$$7. \quad 4 \times 9.3$$

$$8. \quad 3 \times 7.9$$

$$9. \quad 5 \times 42.89$$

$$10. \quad 8 \times 2.6$$


$$11. \quad 6 \times 0.92$$

$$12. \quad 9 \times 1.04$$

$$13. \quad 7 \times 2.18$$

$$14. \quad 3 \times 19.54$$

Problem Solving



15. A half-dollar coin issued by the United States Mint measures 30.61 millimeters across. Mikk has 9 half dollars. He lines them up end to end in a row. What is the total length of the row of half dollars?

16. One pound of grapes costs \$3.49. Linda buys exactly 3 pounds of grapes. How much will the grapes cost?

Name _____

Lesson Objective: Use expanded form and place value to multiply a decimal and a whole number.

Multiply Using Expanded Form

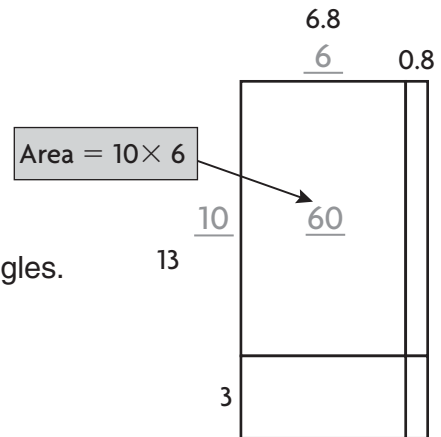
You can use a model and partial products to help you find the product of a two-digit whole number and a decimal.

Find the product. 13×6.8

Step 1 Draw a large rectangle. Label its longer side 13 and its shorter side 6.8. The area of the large rectangle represents the product, 13 \times 6.8.

Step 2 Rewrite the factors in expanded form. Divide the large rectangle into four smaller rectangles. Use the expanded forms to label the smaller rectangles.

$$13 = \underline{10} + \underline{3} \quad 6.8 = \underline{6} + \underline{0.8}$$



Step 3 Multiply to find the area of each small rectangle.

$$10 \times 6 = \underline{60} \quad 10 \times 0.8 = \underline{8} \quad 3 \times 6 = \underline{18} \quad 3 \times 0.8 = \underline{2.4}$$

Step 4 Add to find the total area.

$$\underline{60} + \underline{8} + \underline{18} + \underline{2.4} = \underline{88.4}$$

So, $13 \times 6.8 = \underline{88.4}$.

Draw a model to find the product.

1. $18 \times 0.25 =$ _____

2. $26 \times 7.2 =$ _____

Find the product.

3. $17 \times 9.3 =$ _____

4. $21 \times 43.5 =$ _____

5. $48 \times 4.74 =$ _____

Multiply Using Expanded Form

Draw a model to find the product.

1. $37 \times 9.5 = \underline{351.5}$

	30	7
9	270	6
0.5	15	3.5

2. $84 \times 0.24 = \underline{\hspace{2cm}}$

Find the product.

3. $13 \times 0.53 = \underline{\hspace{2cm}}$

4. $27 \times 89.5 = \underline{\hspace{2cm}}$

5. $32 \times 12.71 = \underline{\hspace{2cm}}$

6. $17 \times 0.52 = \underline{\hspace{2cm}}$

7. $23 \times 59.8 = \underline{\hspace{2cm}}$

8. $61 \times 15.98 = \underline{\hspace{2cm}}$

Problem Solving 

9. An object that weighs one pound on the moon will weigh about 6.02 pounds on Earth. Suppose a moon rock weighs 11 pounds on the moon. How much will the same rock weigh on Earth?

10. Tessa is on the track team. For practice and exercise, she runs 2.25 miles each day. At the end of 14 days, how many total miles will Tessa have run?

Name _____

Problem Solving • Multiply Money

Three students in the garden club enter a pumpkin-growing contest. Jessie's pumpkin is worth \$12.75. Mara's pumpkin is worth 4 times as much as Jessie's. Hayden's pumpkin is worth \$22.25 more than Mara's. How much is Hayden's pumpkin worth?

Read the Problem	Solve the Problem										
<p>What do I need to find?</p> <p>I need to find <u>how much</u> <u>Hayden's pumpkin is worth</u>.</p>	<p>The amount that Hayden's and Mara's pumpkins are worth depends on how much Jessie's pumpkin is worth. Draw a diagram to compare the amounts without calculating. Then use the diagram to find how much each person's pumpkin is worth.</p>										
<p>What information do I need to use?</p> <p>I need to use the worth of <u>Jessie's</u> pumpkin to find how much <u>Mara's</u> and <u>Hayden's</u> pumpkins are worth.</p>	<p>Jessie <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>\$12.75</td></tr></table></p> <p>Mara <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>\$12.75</td><td>\$12.75</td><td>\$12.75</td><td>\$12.75</td></tr></table></p> <p>Hayden <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>\$12.75</td><td>\$12.75</td><td>\$12.75</td><td>\$12.75</td><td>\$22.25</td></tr></table></p>	\$12.75	\$12.75	\$12.75	\$12.75	\$12.75	\$12.75	\$12.75	\$12.75	\$12.75	\$22.25
\$12.75											
\$12.75	\$12.75	\$12.75	\$12.75								
\$12.75	\$12.75	\$12.75	\$12.75	\$22.25							
<p>How will I use the information:</p> <p>I can draw a diagram to show <u>how</u> <u>much Jessie's and Mara's</u> <u>pumpkins are worth to</u> <u>find how much Hayden's</u> <u>pumpkin is worth</u>.</p>	<p>Jessie: \$12.75</p> <p>Mara: $4 \times \underline{\\$12.75} = \underline{\\$51.00}$</p> <p>Hayden: $\underline{\\$51.00} + \\$22.25 = \underline{\\$73.25}$</p>										
<p>So Hayden's pumpkin is worth <u>\$73.25</u>.</p>											

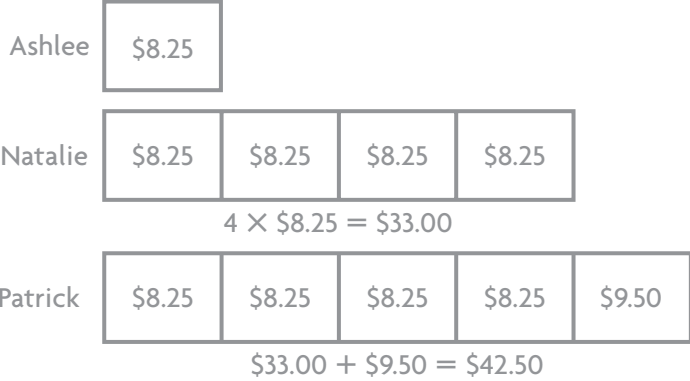
- Three friends go to the local farmers' market. Latasha spends \$3.35. Helen spends 4 times as much as Latasha. Dee spends \$7.50 more than Helen. How much does Dee spend?

- Alexia raises \$75.23 for a charity. Sue raises 3 times as much as Alexia. Manuel raises \$85.89. How much money do the three friends raise for the charity in all?

Problem Solving • Multiply Money

Solve each problem.

1. Three friends go to the local farmers' market. Ashlee spends \$8.25. Natalie spends 4 times as much as Ashlee. Patrick spends \$9.50 more than Natalie. How much does Patrick spend?



\$42.50

2. Kimmy's savings account has a balance of \$76.23 in June. By September, her balance is 5 times as much as her June balance. Between September and December, Kimmy deposits a total of \$87.83 into her account. If she does not withdraw any money from her account, what should Kimmy's balance be in December?

3. Amy raises \$58.75 to participate in a walk-a-thon. Jeremy raises \$23.25 more than Amy. Oscar raises 3 times as much as Jeremy. How much money does Oscar raise?

4. It costs \$5.50 per hour to rent a pair of ice skates, for up to 2 hours. After 2 hours, the rental cost per hour decreases to \$2.50. How much does it cost to rent a pair of ice skates for 4 hours?

Decimal Multiplication

You can use decimal squares to multiply decimals.

Multiply. 0.2×0.9

Step 1 Draw a square with 10 equal rows and 10 equal columns.

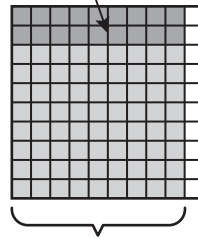
Step 2 Shade 9 columns to represent 0.9.

Step 3 Shade 2 rows to represent 0.2.

Step 4 Count the number of small squares where the shadings overlap: 18 squares, or 0.18.

So, $0.2 \times 0.9 = \underline{0.18}$.

The shadings overlap in 18 squares, or 0.18.



} 2 rows represent 0.2.

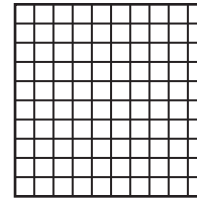
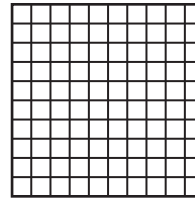
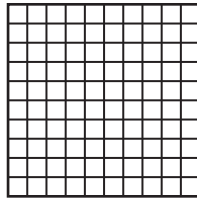
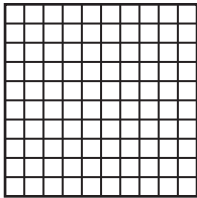
9 columns represent 0.9.

Multiply. Use the decimal model.

1. $0.3 \times 0.2 = \underline{\hspace{2cm}}$

2. $0.9 \times 0.5 = \underline{\hspace{2cm}}$

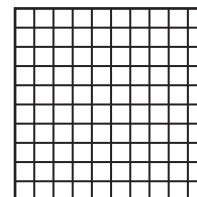
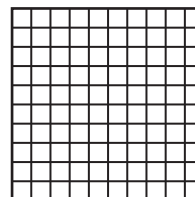
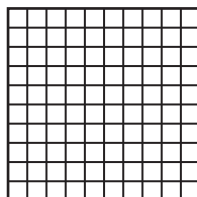
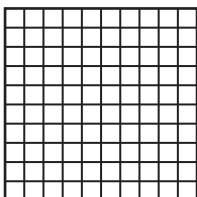
3. $0.1 \times 1.8 = \underline{\hspace{2cm}}$



4. $0.4 \times 0.4 = \underline{\hspace{2cm}}$

5. $0.6 \times 0.5 = \underline{\hspace{2cm}}$

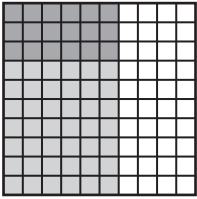
6. $0.4 \times 1.2 = \underline{\hspace{2cm}}$



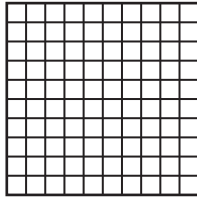
Decimal Multiplication

Multiply. Use the decimal model.

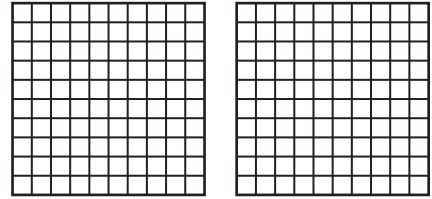
1. $0.3 \times 0.6 =$ 0.18



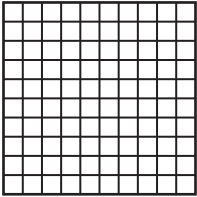
2. $0.2 \times 0.8 =$ _____



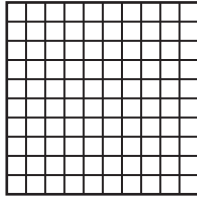
3. $0.5 \times 1.7 =$ _____



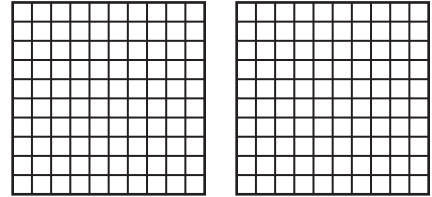
4. $0.6 \times 0.7 =$ _____



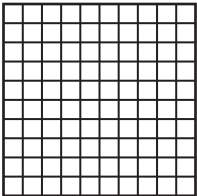
5. $0.8 \times 0.5 =$ _____



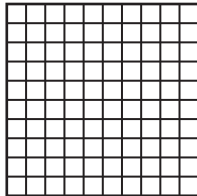
6. $0.4 \times 1.9 =$ _____



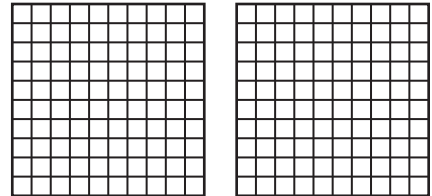
7. $0.8 \times 0.8 =$ _____



8. $0.2 \times 0.5 =$ _____



9. $0.8 \times 1.3 =$ _____



Problem Solving 

10. A certain bamboo plants grow 1.2 feet in 1 day. At that rate, how many feet could the plant grow in 0.5 day?

11. The distance from the park to the grocery store is 0.9 mile. Ezra runs 8 tenths of that distance and walks the rest of the way. How far does Ezra run from the park to the grocery store?

Multiply Decimals

Multiply. 9.3×5.27 **Step 1** Multiply as with whole numbers.

$$\begin{array}{r}
 26 \\
 2 \\
 527 \\
 \times 93 \\
 \hline
 1,581 \\
 + 47,430 \\
 \hline
 49,011
 \end{array}$$

Step 2 Add the number of decimal places in the factors to place the decimal point in the product.

$$\begin{array}{r}
 5.27 \leftarrow \underline{2} \text{ decimal places} \\
 \times 9.3 \leftarrow + \underline{1} \text{ decimal place} \\
 \hline
 1,581 \\
 + 47,430 \\
 \hline
 49.011 \leftarrow \underline{3} \text{ decimal places}
 \end{array}$$

So, $9.3 \times 5.27 = \underline{49.011}$.**Place the decimal point in the product.**

$$\begin{array}{r}
 \mathbf{1.} \quad 1.6 \\
 \times 0.7 \\
 \hline
 112
 \end{array}$$

$$\begin{array}{r}
 \mathbf{2.} \quad 14.2 \\
 \times 7.6 \\
 \hline
 10792
 \end{array}$$

$$\begin{array}{r}
 \mathbf{3.} \quad 3.59 \\
 \times 4.8 \\
 \hline
 17232
 \end{array}$$

Find the product.

$$\begin{array}{r}
 \mathbf{4.} \quad 5.7 \\
 \times 0.8 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \mathbf{5.} \quad 35.1 \\
 \times 8.4 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \mathbf{6.} \quad 2.19 \\
 \times 6.3 \\
 \hline
 \end{array}$$

Multiply Decimals

Find the product.

$$\begin{array}{r}
 1. \quad 5.8 \quad \quad 58 \\
 \times 2.4 \quad \quad \times 24 \\
 \hline
 13.92 \quad \quad 232 \\
 + 1,160 \\
 \hline
 1,392
 \end{array}$$

$$\begin{array}{r}
 2. \quad 7.3 \\
 \times 9.6 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 3. \quad 46.3 \\
 \times 0.8 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 4. \quad 29.5 \\
 \times 1.3 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 5. \quad 3.76 \\
 \times 4.8 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 6. \quad 9.07 \\
 \times 6.5 \\
 \hline
 \end{array}$$

7. 0.42×75.3

8. 5.6×61.84

9. 7.5×18.74

10. 0.9×53.8

Problem Solving 

11. Aretha runs a marathon in 3.25 hours. Neal takes 1.6 times as long to run the same marathon. How many hours does it take Neal to run the marathon?

12. Tiffany catches a fish that weighs 12.3 pounds. Frank catches a fish that weighs 2.5 times as much as Tiffany's fish. How many pounds does Frank's fish weigh?

Zeros in the Product

Sometimes when you multiply two decimals, there are not enough zeros in the product to place the decimal point.

Multiply. 0.9×0.03

Step 1 Multiply as with whole numbers.

$$\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$$

Step 2 Find the number of decimal places in the product by adding the number of decimal places in the factors.

$$\begin{array}{r} 0.03 \leftarrow \underline{2} \text{ decimal places} \\ \times 0.9 \leftarrow + \underline{1} \text{ decimal place} \\ \hline \leftarrow \underline{3} \text{ decimal places} \end{array}$$

Step 3 Place the decimal point.

0.027


There are not enough digits in the product to place the decimal point. Write zeros as needed to the left of the product to place the decimal point.

So, $0.9 \times 0.03 = \underline{0.027}$.

Write zeros in the product.

1. $\begin{array}{r} 0.8 \\ \times 0.1 \\ \hline \square 8 \end{array}$

2. $\begin{array}{r} 0.04 \\ \times 0.7 \\ \hline \square 28 \end{array}$

3. $\begin{array}{r} 0.03 \\ \times 0.3 \\ \hline \square 9 \end{array}$

Find the product.

4. $\begin{array}{r} \$0.06 \\ \times 0.5 \\ \hline \end{array}$

5. $\begin{array}{r} 0.09 \\ \times 0.8 \\ \hline \end{array}$

6. $\begin{array}{r} 0.05 \\ \times 0.7 \\ \hline \end{array}$

Zeros in the Product

Find the product.

$$\begin{array}{r} 1. \quad 0.07 \\ \times 0.2 \\ \hline 0.014 \end{array}$$

$$\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$$

$$2. \quad \begin{array}{r} 0.3 \\ \times 0.1 \\ \hline \end{array}$$

$$3. \quad \begin{array}{r} 0.05 \\ \times 0.8 \\ \hline \end{array}$$

$$4. \quad \begin{array}{r} 0.08 \\ \times 0.3 \\ \hline \end{array}$$

$$5. \quad \begin{array}{r} 0.06 \\ \times 0.7 \\ \hline \end{array}$$

$$6. \quad \begin{array}{r} 0.2 \\ \times 0.4 \\ \hline \end{array}$$

$$7. \quad \begin{array}{r} 0.05 \\ \times 0.4 \\ \hline \end{array}$$

$$8. \quad \begin{array}{r} 0.08 \\ \times 0.8 \\ \hline \end{array}$$

$$9. \quad \begin{array}{r} \$0.90 \\ \times 0.1 \\ \hline \end{array}$$

$$10. \quad \begin{array}{r} 0.02 \\ \times 0.3 \\ \hline \end{array}$$

$$11. \quad \begin{array}{r} 0.09 \\ \times 0.5 \\ \hline \end{array}$$

$$12. \quad \begin{array}{r} \$0.05 \\ \times 0.2 \\ \hline \end{array}$$

Problem Solving 

13. A beaker contains 0.5 liter of a solution. Jordan uses 0.08 of the solution for an experiment. How much of the solution does Jordan use?

14. A certain type of nuts are on sale at \$0.35 per pound. Tamara buys 0.2 pound of nuts. How much will the nuts cost?

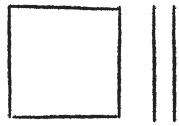
Divide Decimals by Whole Numbers

You can draw a quick picture to help you divide a decimal by a whole number.

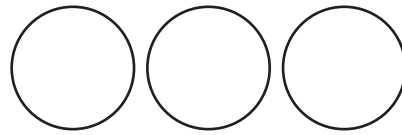
In a decimal model, each large square represents one, or 1. Each bar represents one-tenth, or 0.1.

Divide. $1.2 \div 3$

Step 1 Draw a quick picture to represent the dividend, 1.2.



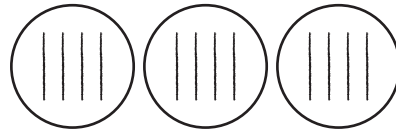
Step 2 Draw 3 circles to represent the divisor, 3.



Step 3 You cannot evenly divide 1 into 3 groups. Regroup 1 as 10 tenths. There are 12 tenths in 1.2.



Step 4 Share the tenths equally among 3 groups.



Each group contains 0 ones and 4 tenths.

So, $1.2 \div 3 = \underline{0.4}$.

Divide. Draw a quick picture.

1. $2.7 \div 9 = \underline{\hspace{2cm}}$

2. $4.8 \div 8 = \underline{\hspace{2cm}}$

3. $2.8 \div 7 = \underline{\hspace{2cm}}$

4. $7.25 \div 5 = \underline{\hspace{2cm}}$

5. $3.78 \div 3 = \underline{\hspace{2cm}}$

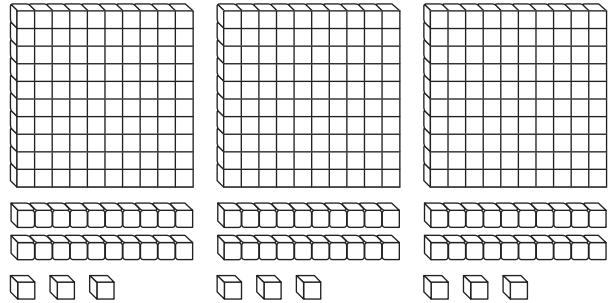
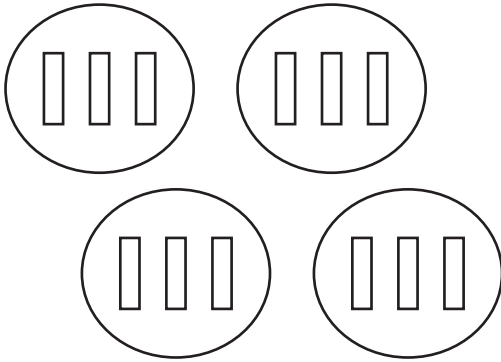
6. $8.52 \div 4 = \underline{\hspace{2cm}}$

Divide Decimals by Whole Numbers

Use the model to complete the number sentence.

1. $1.2 \div 4 = \underline{0.3}$

2. $3.69 \div 3 = \underline{\hspace{2cm}}$



Divide. Use base-ten blocks.

3. $4.9 \div 7 = \underline{\hspace{2cm}}$

4. $3.6 \div 9 = \underline{\hspace{2cm}}$

5. $2.4 \div 8 = \underline{\hspace{2cm}}$

6. $6.48 \div 4 = \underline{\hspace{2cm}}$

7. $3.01 \div 7 = \underline{\hspace{2cm}}$

8. $4.26 \div 3 = \underline{\hspace{2cm}}$

Problem Solving



9. In PE class, Carl runs a distance of 1.17 miles in 9 minutes. At that rate, how far does Carl run in one minute?

10. Marianne spends \$9.45 on 5 greeting cards. Each card costs the same amount. What is the cost of one greeting card?

Estimate Quotients

You can use multiples and compatible numbers to estimate decimal quotients.

Estimate. $249.7 \div 31$

Step 1 Round the divisor, 31, to the nearest 10.

31 rounded to the nearest 10 is 30.

Step 2 Find the multiples of 30 that the dividend, 249.7, is between.

249.7 is between 240 and 270.

Step 3 Divide each multiple by the rounded divisor, 30.

$240 \div 30 = \underline{8}$ $270 \div 30 = \underline{9}$

So, two possible estimates are 8 and 9.

Use compatible numbers to estimate the quotient.

1. $23.6 \div 7$

_____ \div _____ = _____

2. $469.4 \div 62$

_____ \div _____ = _____

Estimate the quotient.

3. $338.7 \div 49$

4. $75.1 \div 9$

5. $674.8 \div 23$

6. $61.9 \div 7$

7. $96.5 \div 19$

8. $57.2 \div 8$

Estimate Quotients

Use compatible numbers to estimate the quotient.

1. $19.7 \div 3$

$18 \div 3 = 6$

2. $394.6 \div 9$

3. $308.3 \div 15$

Estimate the quotient.

4. $63.5 \div 5$

5. $57.8 \div 81$

6. $172.6 \div 39$

7. $43.6 \div 8$

8. $2.8 \div 6$

9. $467.6 \div 8$

10. $209.3 \div 48$

11. $737.5 \div 9$

12. $256.1 \div 82$

Problem Solving 

13. Taylor uses 645.6 gallons of water in 7 days. Suppose he uses the same amount of water each day. About how much water does Taylor use each day?

14. On a road trip, Sandy drives 368.7 miles. Her car uses a total of 18 gallons of gas. About how many miles per gallon does Sandy's car get?

Division of Decimals by Whole Numbers**Divide.** $19.61 \div 37$ **Step 1** Estimate the quotient.

$2,000 \text{ hundredths} \div 40 = \underline{50}$ hundredths, or 0.50.
So, the quotient will have a zero in the ones place.

$$\begin{array}{r} 0 \\ 37 \overline{)19.61} \end{array}$$

Step 2 Divide the tenths.

Use the estimate. Try 5 in the tenths place.

Multiply. $\underline{5} \times 37 = \underline{185}$

Subtract. $196 - \underline{185} = \underline{11}$

Check. $\underline{11} < 37$

$$\begin{array}{r} 0.5 \\ 37 \overline{)19.61} \\ - 185 \\ \hline 11 \end{array}$$

Step 3 Divide the hundredths.Estimate: $120 \text{ hundredths} \div 40 = 3 \text{ hundredths}$.

Multiply. $\underline{3} \times 37 = \underline{111}$

Subtract. $\underline{111} - \underline{111} = \underline{0}$

Check. $\underline{0} < 37$

Place the decimal point in the quotient.

So, $19.61 \div 37 = \underline{0.53}$.

$$\begin{array}{r} 0.53 \\ 37 \overline{)19.61} \\ - 185 \\ \hline 111 \\ - 111 \\ \hline 0 \end{array}$$

Write the quotient with the decimal point placed correctly.

1. $5.94 \div 3 = 198$ _____

2. $48.3 \div 23 = 21$ _____

Divide.

3. $9 \overline{)61.2}$

4. $17 \overline{)83.3}$

5. $9 \overline{)7.38}$

Division of Decimals by Whole Numbers

Divide.

$$\begin{array}{r}
 1.32 \\
 7 \overline{)9.24} \\
 \underline{-7} \\
 22 \\
 \underline{-21} \\
 14 \\
 \underline{-14} \\
 0
 \end{array}$$

2. $6 \overline{)5.04}$

3. $23 \overline{)85.1}$

4. $36 \overline{)86.4}$

5. $6 \overline{)\$6.48}$

6. $8 \overline{)59.2}$

7. $5 \overline{)2.35}$

8. $41 \overline{)278.8}$

9. $19 \overline{)\$70.49}$

10. $4 \overline{)\$9.48}$

11. $18 \overline{)82.8}$

12. $37 \overline{)32.93}$

Problem Solving 

13. On Saturday, 12 friends go ice skating. Altogether, they pay \$83.40 for admission. They share the cost equally. How much does each person pay?

14. A team of 4 people participates in a 400-yard relay race. Each team member runs the same distance. The team completes the race in a total of 53.2 seconds. What is the average running time for each person?

Name _____

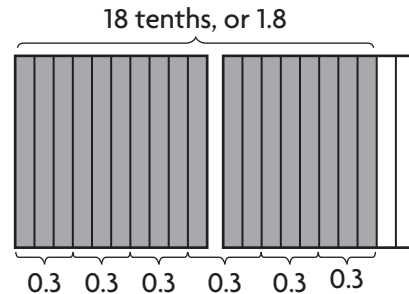
Decimal Division

You can use decimal models to divide tenths.

Divide. $1.8 \div 0.3$.

Step 1 Shade 18 tenths to represent the dividend, 1.8.

Step 2 Divide the 18 tenths into groups of 3 tenths to represent the divisor, 0.3.



Step 3 Count the groups.

There are 6 groups of 0.3 in 1.8. So, $1.8 \div 0.3 = \underline{6}$.

You can use decimal models to divide hundredths.

Divide. $0.42 \div 0.06$

Step 1 Shade 42 squares to represent the dividend, 0.42.

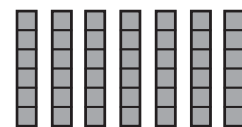
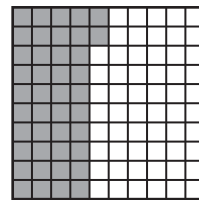
Step 2 Divide the 42 small squares into groups of 6 hundredths to represent the divisor, 0.06.

There are 42 shaded

squares, or 0.42.

There are 7 groups

of 6 hundredths.

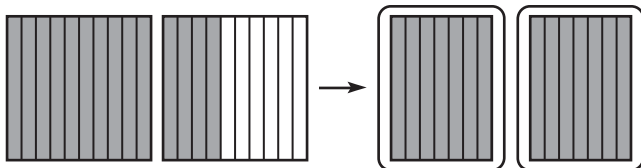


Step 3 Count the groups.

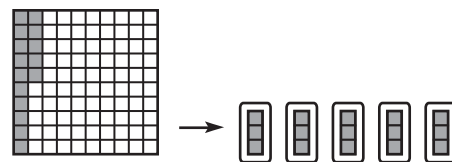
There are 7 groups of 0.06 in 0.42. So, $0.42 \div 0.06 = \underline{7}$.

Use the model to complete the number sentence.

1. $1.4 \div 0.7 = \underline{\hspace{2cm}}$



2. $0.15 \div 0.03 = \underline{\hspace{2cm}}$



Divide. Use decimal models.

3. $2.7 \div 0.3 = \underline{\hspace{2cm}}$

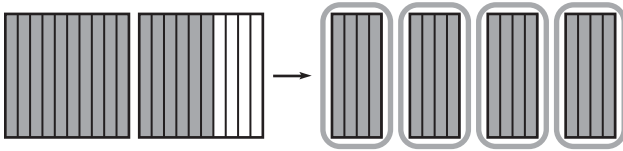
4. $0.52 \div 0.26 = \underline{\hspace{2cm}}$

5. $0.96 \div 0.16 = \underline{\hspace{2cm}}$

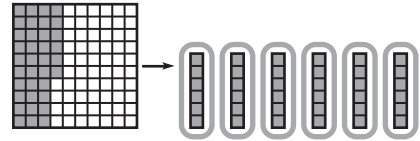
Decimal Division

Use the model to complete the number sentence.

1. $1.6 \div 0.4 = \underline{\quad 4 \quad}$



2. $0.36 \div 0.06 = \underline{\hspace{2cm}}$



Divide. Use decimal models.

3. $2.8 \div 0.7 = \underline{\hspace{2cm}}$

4. $0.40 \div 0.05 = \underline{\hspace{2cm}}$

5. $0.45 \div 0.05 = \underline{\hspace{2cm}}$

6. $1.62 \div 0.27 = \underline{\hspace{2cm}}$

7. $0.56 \div 0.08 = \underline{\hspace{2cm}}$

8. $1.8 \div 0.9 = \underline{\hspace{2cm}}$

Problem Solving



9. Keisha buys 2.4 kilograms of rice. She separates the rice into packages that contain 0.4 kilogram of rice each. How many packages of rice can Keisha make?

10. Leighton is making cloth headbands. She has 4.2 yards of cloth. She uses 0.2 yard of cloth for each headband. How many headbands can Leighton make from the length of cloth she has?

Divide Decimals

You can multiply the dividend and the divisor by the same power of 10 to make the divisor a whole number. As long as you multiply both the dividend and the divisor by the same power of 10, the quotient stays the same.

Example 1: Divide. $0.84 \div 0.07$

Multiply the dividend, 0.84, and the divisor, 0.07, by the power of 10 that makes the divisor a whole number.

$$\begin{array}{r} 0.84 \div 0.07 = ? \\ \downarrow \quad \downarrow \\ \times 100 \quad \times 100 \\ \downarrow \quad \downarrow \\ \underline{84} \div \underline{7} = 12 \end{array}$$

Since $84 \div 7 = 12$, you know that $0.84 \div 0.07 = \underline{12}$.

Example 2: Divide. $4.42 \div 3.4$

Multiply both the dividend and the divisor by 10 to make the divisor a whole number.

$$3.4 \overline{)4.42} \xrightarrow{\text{Multiply 3.4 and 4.42 both by 10}} 34 \overline{)44.2}$$

Divide as you would whole numbers. Place the decimal point in the quotient, above the decimal point in the dividend.

So, $4.42 \div 3.4 = \underline{1.3}$.

$$\begin{array}{r} 1.3 \\ 34 \overline{)44.2} \\ \underline{-34} \\ 102 \\ \underline{-102} \\ 0 \end{array}$$

Copy and complete the pattern.

1. $54 \div 6 = \underline{\hspace{2cm}}$

2. $184 \div 23 = \underline{\hspace{2cm}}$

3. $138 \div 2 = \underline{\hspace{2cm}}$

$5.4 \div \underline{\hspace{2cm}} = 9$

$18.4 \div \underline{\hspace{2cm}} = 8$

$13.8 \div \underline{\hspace{2cm}} = 69$

$\underline{\hspace{2cm}} \div 0.06 = 9$

$\underline{\hspace{2cm}} \div 0.23 = 8$

$\underline{\hspace{2cm}} \div 0.02 = 69$

Divide.

4. $1.4 \overline{)9.8}$

5. $0.3 \overline{)0.6}$

6. $3.64 \div 1.3$

Divide Decimals

Divide.

1. $0.4 \overline{)8.4}$

Multiply both
0.4 and 8.4 by
10 to make the
divisor a whole
number. Then
divide.

$$\begin{array}{r} 21 \\ 4 \overline{)84} \\ \underline{-8} \\ 04 \\ \underline{-4} \\ 0 \end{array}$$

2. $0.2 \overline{)0.4}$

3. $0.07 \overline{)1.68}$

4. $0.37 \overline{)5.18}$

5. $0.4 \overline{)10.4}$

6. $6.3 \div 0.7$

7. $1.52 \div 1.9$

8. $12.24 \div 0.34$

9. $10.81 \div 2.3$

Problem Solving 

10. At the market, grapes cost \$0.85 per pound. Clarissa buys grapes and pays a total of \$2.55. How many pounds of grapes does she buy?

11. Damon kayaks on a river near his home. He plans to kayak a total of 6.4 miles. Damon kayaks at an average speed of 1.6 miles per hour. How many hours will it take Damon to kayak the 6.4 miles?

Write Zeros in the Dividend

When there are not enough digits in the dividend to complete the division, you can write zeros to the right of the last digit in the dividend. Writing zeros will not change the value of the dividend or the quotient.

Divide. $5.2 \div 8$

Step 1 Divide as you would whole numbers. Place the decimal point in the quotient above the decimal point in the dividend.

$$\begin{array}{r} 0.6 \\ 8 \overline{)5.2} \\ \underline{-48} \\ 4 \end{array}$$

The decimal point in the quotient is directly above the decimal point in the dividend.

Step 2 The difference is less than the divisor. Write a 0 in the dividend and continue to divide.

$$\begin{array}{r} 0.65 \\ 8 \overline{)5.20} \\ \underline{-48} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

The difference, 4, is less than the divisor.

Write a 0 in the dividend. Then continue to divide.

So, $5.2 \div 8 = \underline{0.65}$.

Write the quotient with the decimal point placed correctly.

1. $3 \div 0.4 = 75$

2. $25.2 \div 8 = 315$

3. $60 \div 25 = 24$

4. $8.28 \div 0.72 = 115$

Divide.

5. $6 \overline{)43.5}$

6. $1.4 \overline{)7.7}$

7. $30 \overline{)72}$

8. $0.18 \overline{)0.63}$

Write Zeros in the Dividend

Divide.

$$\begin{array}{r}
 3.95 \\
 6 \overline{)23.70} \\
 \underline{-18} \\
 57 \\
 \underline{-54} \\
 30 \\
 \underline{-30} \\
 0
 \end{array}$$

2. $25 \overline{)405}$

3. $0.6 \overline{)12.9}$

4. $0.8 \overline{)30}$

5. $4 \overline{)36.2}$

6. $35 \overline{)97.3}$

7. $7.8 \div 15$

8. $49 \div 14$

9. $52.2 \div 12$

10. $1.14 \div 0.76$

11. $20.2 \div 4$

12. $138.4 \div 16$

Problem Solving 

13. Mark has a board that is 12 feet long. He cuts the board into 8 pieces that are the same length. How long is each piece?

14. Josh pays \$7.59 for 2.2 pounds of ground turkey. What is the price per pound of the ground turkey?

Name _____

Problem Solving • Decimal Operations

Rebecca spent \$32.55 for a photo album and three identical candles. The photo album cost \$17.50 and the sales tax was \$1.55. How much did each candle cost?

Read the Problem		
What do I need to find?	What information do I need to use?	How will I use the information?
I need to find <u>the cost of each candle</u> .	Rebecca spent <u>\$32.55</u> for a photo album and <u>3</u> candles. The photo album cost <u>\$17.50</u> . The sales tax was <u>\$1.55</u> .	I can <u>use a flowchart and work backward from the total amount Rebecca spent to find the cost of each candle</u> .
Solve the Problem		
<ul style="list-style-type: none"> Make a flowchart to show the information. Then work backward to solve. 		
<p style="text-align: center;"> $\begin{array}{ccccccc} \boxed{\text{Cost of 3 candles}} & \xrightarrow{\text{plus}} & \boxed{\text{Cost of photo album}} & \xrightarrow{\text{plus}} & \boxed{\text{Sales tax}} & \xrightarrow{\text{equals}} & \boxed{\text{Total spent}} \\ 3 \times \text{cost of each candle} & + & \\$17.50 & + & \\$1.55 & = & \\$32.55 \end{array}$ </p> <p style="text-align: center;"> $\begin{array}{ccccccc} \boxed{\text{Total spent}} & \xrightarrow{\text{minus}} & \boxed{\text{Sales tax}} & \xrightarrow{\text{minus}} & \boxed{\text{Cost of photo album}} & \xrightarrow{\text{equals}} & \boxed{\text{Cost of 3 candles}} \\ \\$32.55 & - & \\$1.55 & - & \\$17.50 & = & \\$13.50 \end{array}$ </p>		
<ul style="list-style-type: none"> Divide the cost of 3 candles by 3 to find the cost of each candle. <p style="margin-left: 20px;"><u>\$13.50</u> ÷ 3 = <u>\$4.50</u></p> <p>So, each candle cost \$4.50.</p>		

Use a flowchart to help you solve the problem.

1. Maria spent \$28.69 on one pair of jeans and two T-shirts. The jeans cost \$16.49. Each T-shirt cost the same amount. The sales tax was \$1.62. How much did each T-shirt cost?
2. At the skating rink, Sean and Patrick spent \$17.45 on admission and snacks. They used one coupon for \$2 off the admission cost. The snacks cost \$5.95. What is the admission cost for one?

Problem Solving • Decimal Operations

1. Lily spent \$30.00 on a T-shirt, a sandwich, and 2 books. The T-shirt cost \$8.95, and the sandwich cost \$7.25. The books each cost the same amount. How much did each book cost?

$$(2 \times \text{cost of each book}) + \$8.95 + \$7.25 = \$30.00$$

$$\$30.00 - \$8.95 - \$7.25 = (2 \times \text{cost of each book})$$

$$(2 \times \text{cost of each book}) = \$13.80$$

$$\$13.80 \div 2 = \$6.90$$

\$6.90

2. Meryl spends a total of \$68.82 for 2 pairs of sneakers with the same cost. The sales tax is \$5.32. Meryl also uses a coupon for \$3.00 off her purchase. How much does each pair of sneakers cost?

3. A 6-pack of undershirts costs \$13.98. This is \$3.96 less than the cost of buying 6 individual shirts. If each undershirt costs the same amount, how much does each undershirt cost when purchased individually?

4. Mason spent \$15.85 for 3 notebooks and 2 boxes of markers. The boxes of markers cost \$3.95 each, and the sales tax was \$1.23. Mason also used a coupon for \$0.75 off his purchase. If each notebook had the same cost, how much did each notebook cost?

Lesson Objective: Find a common denominator or a least common denominator to write equivalent fractions.

Common Denominators and Equivalent Fractions

You can find a common denominator of two fractions.

A **common denominator** of two fractions is a common multiple of their denominators.

Find a common denominator of $\frac{1}{6}$ and $\frac{7}{10}$. Rewrite the pair of fractions using a common denominator.

Step 1 Identify the denominators.
The denominators are 6 and 10.

Step 2 List the multiples of the greater denominator, 10.
Multiples of 10: 10, 20, 30, 40, 50, 60, ...

Step 3 Check if any of the multiples of the greater denominator are evenly divisible by the other denominator.

Both 30 and 60 are evenly divisible by 6.
Common denominators of $\frac{1}{6}$ and $\frac{7}{10}$ are 30 and 60.

Step 4 Rewrite the fractions with a denominator of 30.
Multiply the numerator and the denominator of each fraction by the same number so that the denominator results in 30.

$$\frac{1}{6} = \frac{1 \times 5}{6 \times 5} = \frac{5}{30} \quad \frac{7}{10} = \frac{7 \times 3}{10 \times 3} = \frac{21}{30}$$

Use a common denominator to write an equivalent fraction for each fraction.

1. $\frac{5}{12}, \frac{2}{9}$

common denominator: _____

2. $\frac{3}{8}, \frac{5}{6}$

common denominator: _____

3. $\frac{2}{9}, \frac{1}{6}$

common denominator: _____

4. $\frac{3}{4}, \frac{9}{10}$

common denominator: _____

Common Denominators and Equivalent Fractions

Use a common denominator to write an equivalent fraction for each fraction.

1. $\frac{1}{5}, \frac{1}{2}$ common denominator: **10**

2. $\frac{1}{4}, \frac{2}{3}$ common denominator: _____

3. $\frac{5}{6}, \frac{1}{3}$ common denominator: _____

Think: 10 is a multiple of 5 and 2.
Find equivalent fractions with a denominator of 10.

4. $\frac{3}{5}, \frac{1}{3}$ common denominator: _____

5. $\frac{1}{2}, \frac{3}{8}$ common denominator: _____

6. $\frac{1}{6}, \frac{1}{4}$ common denominator: _____

Use the least common denominator to write an equivalent fraction for each fraction.

7. $\frac{5}{6}, \frac{2}{9}$

8. $\frac{1}{12}, \frac{3}{8}$

9. $\frac{5}{9}, \frac{2}{15}$

Problem Solving**REAL WORLD**

10. Ella spends $\frac{2}{3}$ hour practicing the piano each day. She also spends $\frac{1}{2}$ hour jogging. What is the least common denominator of the fractions?

11. In a science experiment, a plant grew $\frac{3}{4}$ inch one week and $\frac{1}{2}$ inch the next week. Use a common denominator to write an equivalent fraction for each fraction.

Add and Subtract Fractions

To add or subtract fractions with unlike denominators, you need to rename them as fractions with like denominators. You can do this by making a list of equivalent fractions.

Add. $\frac{5}{12} + \frac{1}{8}$

Step 1 Write equivalent fractions for $\frac{5}{12}$.

$$\frac{5}{12}, \frac{10}{24}, \frac{15}{36}, \frac{20}{48}$$

Step 2 Write equivalent fractions for $\frac{1}{8}$.

$$\frac{1}{8}, \frac{2}{16}, \frac{3}{24}$$

Step 3 Rewrite the problem using the equivalent fractions.

Then add.

$$\frac{5}{12} + \frac{1}{8} \text{ becomes } \frac{10}{24} + \frac{3}{24} = \frac{13}{24}$$

Stop when you find two fractions with the same denominator.

Subtract. $\frac{9}{10} - \frac{1}{2}$

Step 1 Write equivalent fractions for $\frac{9}{10}$.

$$\frac{9}{10}, \frac{18}{20}, \frac{27}{30}, \frac{36}{40}$$

Step 2 Write equivalent fractions for $\frac{1}{2}$.

$$\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}$$

Step 3 Rewrite the problem using the equivalent fractions.

Then subtract.

$$\frac{9}{10} - \frac{1}{2} \text{ becomes } \frac{9}{10} - \frac{5}{10} = \frac{4}{10}. \text{ Written in simplest form, } \frac{4}{10} = \frac{2}{5}$$

Find the sum or difference. Write your answer in simplest form.

1. $\frac{2}{9} + \frac{1}{3}$

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

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

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

5. $\frac{7}{8} - \frac{1}{4}$

6. $\frac{3}{4} - \frac{2}{3}$

7. $\frac{9}{10} - \frac{4}{5}$

8. $\frac{8}{9} - \frac{5}{6}$

Add and Subtract Fractions

Find the sum or difference. Write your answer in simplest form.

1. $\frac{1}{2} - \frac{1}{7}$

$$\begin{array}{r} \frac{1}{2} \rightarrow \frac{7}{14} \\ 2\frac{1}{7} \rightarrow 2\frac{2}{14} \\ \hline \frac{5}{14} \end{array}$$

2. $\frac{7}{10} - \frac{1}{2}$

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

4. $\frac{5}{8} + \frac{2}{5}$

5. $\frac{9}{10} - \frac{1}{3}$

6. $\frac{3}{4} - \frac{2}{5}$

7. $\frac{5}{7} - \frac{1}{4}$

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

9. $\frac{5}{6} + \frac{2}{5}$

10. $\frac{1}{6} - \frac{1}{10}$

11. $\frac{6}{11} - \frac{1}{2}$

12. $\frac{5}{6} + \frac{3}{7}$

Problem Solving 

13. Kaylin mixed two liquids for a science experiment. One container held $\frac{7}{8}$ cup and the other held $\frac{9}{10}$ cup. What is the total amount of the mixture?

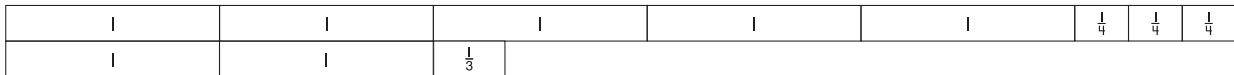
14. Henry bought $\frac{1}{4}$ pound of screws and $\frac{2}{5}$ pound of nails to build a skateboard ramp. What is the total weight of the screws and nails?

Add and Subtract Mixed Numbers

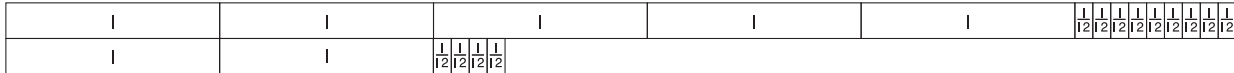
When you add or subtract mixed numbers, you may need to rename the fractions as fractions with a common denominator.

Find the sum. Write the answer in simplest form. $5\frac{3}{4} + 2\frac{1}{3}$

Step 1 Model $5\frac{3}{4}$ and $2\frac{1}{3}$.



Step 2 A common denominator for $\frac{3}{4}$ and $\frac{1}{3}$ is 12, so rename $5\frac{3}{4}$ as $5\frac{9}{12}$ and $2\frac{1}{3}$ as $2\frac{4}{12}$.



Step 3 Add the fractions.

$$\frac{9}{12} + \frac{4}{12} = \frac{13}{12}$$

Step 4 Add the whole numbers

$$5 + 2 = 7$$

Add the sums. Write the answer in simplest form.

$$\frac{13}{12} + 7 = 7\frac{13}{12}, \text{ or } 8\frac{1}{12}$$

So, $5\frac{3}{4} + 2\frac{1}{3} = 8\frac{1}{12}$.

Find the sum or difference. Write your answer in simplest form.

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

2. $10\frac{5}{6} + 5\frac{3}{4}$

3. $11\frac{7}{8} - 9\frac{5}{6}$

4. $18\frac{3}{5} - 14\frac{1}{2}$

Add and Subtract Mixed Numbers

Find the sum or difference. Write your answer in simplest form.

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

$$\begin{array}{r} 3\frac{1}{2} \rightarrow 3\frac{5}{10} \\ -1\frac{1}{5} \rightarrow -1\frac{2}{10} \\ \hline 2\frac{3}{10} \end{array}$$

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

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

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

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

6. $5\frac{17}{18} - 2\frac{2}{3}$

7. $6\frac{3}{4} - 1\frac{5}{8}$

8. $5\frac{3}{7} - 2\frac{1}{5}$

9. $4\frac{1}{8} + 2\frac{5}{12}$

10. $6\frac{6}{7} - 2\frac{3}{4}$

11. $5\frac{5}{6} - 2\frac{3}{4}$

12. $2\frac{6}{25} - 1\frac{1}{10}$

Problem Solving**REAL WORLD**

13. Jacobi bought $7\frac{1}{2}$ pounds of meatballs. He decided to cook $1\frac{1}{4}$ pounds and freeze the rest. How many pounds did he freeze?

14. Jill walked $8\frac{1}{8}$ miles to a park and then $7\frac{2}{5}$ miles home. How many miles did she walk in all?

Subtraction with Renaming

You can use a common denominator to find the difference of two mixed numbers.

Estimate. $9\frac{1}{6} - 2\frac{3}{4}$

Step 1 Estimate by using 0, $\frac{1}{2}$, and 1 as benchmarks.

$$9\frac{1}{6} - 2\frac{3}{4} \rightarrow 9 - 3 = 6$$

So, the difference should be close to 6.

Step 2 Identify a common denominator.

$$9\frac{1}{6} - 2\frac{3}{4} \quad \text{A common denominator of 6 and 4 is 12.}$$

Step 3 Write equivalent fractions using the common denominator.

$$9\frac{1}{6} = 9 + \frac{1 \times 2}{6 \times 2} = 9\frac{2}{12}$$

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

Step 4 Rename if needed. Then subtract.

$$\text{Since } \frac{2}{12} < \frac{9}{12}, \text{ rename } 9\frac{2}{12} \text{ as } 8\frac{14}{12}.$$

$$\text{Subtract. } 8\frac{14}{12} - 2\frac{9}{12} = 6\frac{5}{12}$$

$$\text{So, } 9\frac{1}{6} - 2\frac{3}{4} = 6\frac{5}{12}.$$

Since the difference of $6\frac{5}{12}$ is close to 6, the answer is reasonable.

Estimate. Then find the difference and write it in simplest form.

1. Estimate: _____

$$5\frac{1}{3} - 3\frac{5}{6} \quad \underline{\hspace{2cm}}$$

2. Estimate: _____

$$7\frac{1}{4} - 2\frac{5}{12} \quad \underline{\hspace{2cm}}$$

3. Estimate: _____

$$8\frac{2}{3} - 2\frac{7}{9} \quad \underline{\hspace{2cm}}$$

4. Estimate: _____

$$9\frac{2}{5} - 3\frac{3}{4} \quad \underline{\hspace{2cm}}$$

5. Estimate: _____

$$7\frac{3}{16} - 1\frac{5}{8} \quad \underline{\hspace{2cm}}$$

6. Estimate: _____

$$2\frac{4}{9} - 1\frac{11}{18} \quad \underline{\hspace{2cm}}$$

Subtraction with Renaming

Estimate. Then find the difference and write it in simplest form.

1. Estimate: _____

$6\frac{1}{3} - 1\frac{2}{5}$

$$\begin{array}{r}
 6\frac{1}{3} \rightarrow \cancel{6}^5 \frac{5}{5} \\
 -1\frac{2}{5} \rightarrow -1\frac{6}{15} \\
 \hline
 4\frac{14}{15}
 \end{array}$$

2. Estimate: _____

$4\frac{1}{2} - 3\frac{5}{6}$

3. Estimate: _____

$9 - 3\frac{7}{8}$

4. Estimate: _____

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

5. Estimate: _____

$8 - 6\frac{1}{9}$

6. Estimate: _____

$9\frac{1}{4} - 3\frac{2}{3}$

7. Estimate: _____

$2\frac{1}{8} - 1\frac{2}{7}$

8. Estimate: _____

$8\frac{1}{5} - 3\frac{5}{9}$

9. Estimate: _____

$10\frac{2}{3} - 5\frac{9}{10}$

Problem Solving**REAL WORLD**

10. Carlene bought $8\frac{1}{16}$ yards of ribbon to decorate a shirt. She only used $5\frac{1}{2}$ yards. How much ribbon does she have left over?

11. During his first vet visit, Pedro's puppy weighed $6\frac{1}{8}$ pounds. On his second visit, he weighed $9\frac{1}{16}$ pounds. How much weight did he gain between visits?

Algebra • Patterns with Fractions

You can find an unknown term in a sequence by finding a rule for the sequence.

Find the unknown term in the sequence.

$$1\frac{2}{5}, 1\frac{7}{10}, 2, \underline{\hspace{1cm}}, 2\frac{3}{5}$$

Step 1 Find equivalent fractions with a common denominator for all of the terms.

The denominators are 5 and 10. A common denominator is 10.

$$1\frac{2}{5} = 1\frac{4}{10} \text{ and } 2\frac{3}{5} = 2\frac{6}{10}$$

Step 2 Write the terms in the sequence using the common denominator.

$$1\frac{4}{10}, 1\frac{7}{10}, 2, \underline{\hspace{1cm}}, 2\frac{6}{10}$$

Step 3 Write a rule that describes the pattern.

The sequence increases. To find the difference between terms, subtract at least two pairs of consecutive terms.

$$1\frac{7}{10} - 1\frac{4}{10} = \frac{3}{10} \qquad 2 - 1\frac{7}{10} = \frac{3}{10}$$

So, a rule is to add $\frac{3}{10}$.

Step 4 Use the rule to find the unknown term.

Add $\frac{3}{10}$ to the third term to find the unknown term.

$$2 + \frac{3}{10} = 2\frac{3}{10}$$

Write a rule for the sequence. Then, find the unknown term.

1. $2\frac{2}{3}, 3\frac{1}{2}, \underline{\hspace{1cm}}, 5\frac{1}{6}, 6$

2. $4\frac{1}{2}, 3\frac{7}{8}, 3\frac{1}{4}, \underline{\hspace{1cm}}, 2$

Rule: _____

Rule: _____

Patterns with Fractions

Write a rule for the sequence. Then, find the unknown term.

1. $\frac{1}{2}, \frac{2}{3}, \frac{5}{6}, 1, 1\frac{1}{6}$

2. $1\frac{3}{8}, 1\frac{3}{4}, 2\frac{1}{8}, \underline{\hspace{1cm}}, 2\frac{7}{8}$

Think: The pattern is increasing.Add $\frac{1}{6}$ to find the next term.

Rule: _____

Rule: _____

3. $1\frac{9}{10}, 1\frac{7}{10}, \underline{\hspace{1cm}}, 1\frac{3}{10}, 1\frac{1}{10}$

4. $2\frac{5}{12}, 2\frac{1}{6}, 1\frac{11}{12}, \underline{\hspace{1cm}}, 1\frac{5}{12}$

Rule: _____

Rule: _____

Write the first four terms of the sequence.

5. **Rule:** start at $\frac{1}{2}$, add $\frac{1}{3}$

6. **Rule:** start at $3\frac{1}{8}$, subtract $\frac{3}{4}$

7. **Rule:** start at $5\frac{1}{2}$, add $1\frac{1}{5}$

8. **Rule:** start at $6\frac{2}{3}$, subtract $1\frac{1}{4}$

9. Jarett's puppy weighed $3\frac{3}{4}$ ounces at birth. At one week old, the puppy weighed $5\frac{1}{8}$ ounces. At two weeks old, the puppy weighed $6\frac{1}{2}$ ounces. If the weight gain continues in this pattern, how much will the puppy weigh at three weeks old?

10. A baker started out with 12 cups of flour. She had $9\frac{1}{4}$ cups of flour left after the first batch of batter she made. She had $6\frac{1}{2}$ cups of flour left after the second batch of batter she made. If she makes two more batches of batter, how many cups of flour will be left?

Algebra • Use Properties of Addition

You can use the properties of addition to help you add fractions with unlike denominators.

Use the Commutative Property and the Associative Property.

Add. $\left(3\frac{2}{5} + 1\frac{7}{15}\right) + 2\frac{1}{5}$

$$\left(3\frac{2}{5} + 1\frac{7}{15}\right) + 2\frac{1}{5} = \left(1\frac{7}{15} + 3\frac{2}{5}\right) + 2\frac{1}{5} \quad \leftarrow \text{Use the Commutative Property to order fractions with like denominators.}$$

$$= 1\frac{7}{15} + \left(3\frac{2}{5} + 2\frac{1}{5}\right) \quad \leftarrow \text{Use the Associative Property to group fractions with like denominators.}$$

$$= 1\frac{7}{15} + 5\frac{3}{5} \quad \leftarrow \text{Use mental math to add the fractions with like denominators.}$$

$$= 1\frac{7}{15} + 5\frac{9}{15} \quad \leftarrow \text{Write equivalent fractions with like denominators. Then add.}$$

$$= 6\frac{16}{15} = 7\frac{1}{15} \quad \leftarrow \text{Rename and simplify.}$$

Use the properties and mental math to solve. Write your answer in simplest form.

1. $\left(\frac{5}{7} + \frac{3}{14}\right) + \frac{4}{7}$ _____

2. $\left(\frac{2}{5} + \frac{5}{9}\right) + \frac{7}{9}$ _____

3. $\left(3\frac{7}{10} + 5\frac{3}{4}\right) + \frac{3}{4}$ _____

4. $2\frac{5}{12} + \left(4\frac{2}{3} + 3\frac{7}{12}\right)$ _____

5. $3\frac{3}{8} + \left(2\frac{1}{5} + 5\frac{1}{8}\right)$ _____

6. $\left(4\frac{3}{7} + 2\frac{1}{6}\right) + 3\frac{5}{7}$ _____

Use Properties of Addition

Use the properties and mental math to solve. Write your answer in simplest form.

1. $(2\frac{1}{3} + 1\frac{2}{5}) + 3\frac{2}{3}$

$= (1\frac{2}{5} + 2\frac{1}{3}) + 3\frac{2}{3}$

$= 1\frac{2}{5} + (2\frac{1}{3} + 3\frac{2}{3})$

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

$= 7\frac{2}{5}$

2. $8\frac{1}{5} + (4\frac{2}{5} + 3\frac{3}{10})$

3. $(1\frac{3}{4} + 2\frac{3}{8}) + 5\frac{7}{8}$

4. $2\frac{1}{10} + (1\frac{2}{7} + 4\frac{9}{10})$

5. $(4\frac{3}{5} + 6\frac{1}{3}) + 2\frac{3}{5}$

6. $1\frac{1}{4} + (3\frac{2}{3} + 5\frac{3}{4})$

7. $(7\frac{1}{8} + 1\frac{2}{7}) + 4\frac{3}{7}$

8. $3\frac{1}{4} + (3\frac{1}{4} + 5\frac{1}{5})$

9. $6\frac{2}{3} + (5\frac{7}{8} + 2\frac{1}{3})$

Problem Solving**REAL WORLD**

10. Elizabeth rode her bike $6\frac{1}{2}$ miles from her house to the library and then another $2\frac{2}{5}$ miles to her friend Milo's house. If Carson's house is $2\frac{1}{2}$ miles beyond Milo's house, how far would she travel from her house to Carson's house?

11. Hassan made a vegetable salad with $2\frac{3}{8}$ pounds of tomatoes, $1\frac{1}{4}$ pounds of asparagus, and $2\frac{7}{8}$ pounds of potatoes. How many pounds of vegetables did he use altogether?

Name _____

Addition with Unlike Denominators

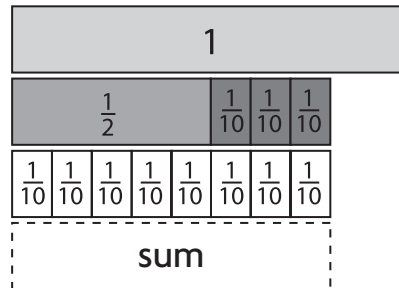
Karen is stringing a necklace with beads. She puts green beads on $\frac{1}{2}$ of the string and purple beads on $\frac{3}{10}$ of the string. How much of the string does Karen cover with beads?

You can use fraction strips to help you add fractions with unlike denominators. Trade fraction strips of fractions with unlike denominators for equivalent strips of fractions with like denominators.

Use fraction strips to find the sum. Write your answer in simplest form.

$$\frac{1}{2} + \frac{3}{10}$$

Step 1 Use a $\frac{1}{2}$ strip and three $\frac{1}{10}$ strips to model fractions with unlike denominators.



Step 2 Trade the $\frac{1}{2}$ strip for five $\frac{1}{10}$ strips.

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

Step 3 Add the fractions with like denominators.

$$\frac{5}{10} + \frac{3}{10} = \frac{8}{10}$$

Step 4 Write the answer in simplest form.

$$\frac{8}{10} = \frac{4}{5}$$

So, Karen covers $\frac{4}{5}$ of the string with beads.

Use fraction strips to find the sum. Write your answer in simplest form.

1. $\frac{3}{8} + \frac{3}{4}$

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

3. $\frac{5}{6} + \frac{7}{12}$

Addition with Unlike Denominators

Use fraction strips to find the sum. Write your answer in simplest form.

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

$\frac{1}{2} + \frac{3}{4} = \frac{2}{4} + \frac{3}{4} = \frac{5}{4}$, or $1\frac{1}{4}$

$1\frac{1}{4}$

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

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

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

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

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

7. $\frac{1}{2} + \frac{2}{5}$

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

9. $\frac{7}{8} + \frac{1}{2}$

10. $\frac{5}{6} + \frac{1}{3}$

11. $\frac{1}{5} + \frac{1}{2}$

12. $\frac{3}{4} + \frac{3}{8}$

Problem Solving**REAL WORLD**

13. Brandus bought $\frac{1}{3}$ pound of ground turkey and $\frac{3}{4}$ pound of ground beef to make sausages. How many pounds of meat did he buy?

14. To make a ribbon and bow for a hat, Stacey needs $\frac{5}{6}$ yard of black ribbon and $\frac{2}{3}$ yard of red ribbon. How much total ribbon does she need?

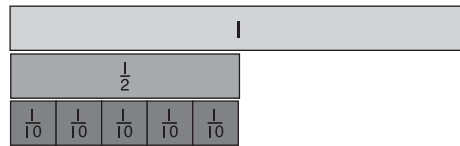
Subtraction with Unlike Denominators

You can use fraction strips to help you subtract fractions with unlike denominators. Trade fraction strips of fractions with unlike denominators for equivalent strips of fractions with like denominators.

Use fraction strips to find the difference. Write your answer in simplest form.

$$\frac{1}{2} - \frac{1}{10}$$

Step 1 Use a $\frac{1}{2}$ fraction strip to model the first fraction.

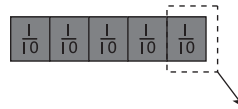


Step 2 Trade the $\frac{1}{2}$ strip for five $\frac{1}{10}$ strips.

$$\frac{1}{2} - \frac{1}{10} = \frac{5}{10} - \frac{1}{10}$$

Step 3 Subtract by taking away $\frac{1}{10}$.

$$\frac{5}{10} - \frac{1}{10} = \frac{4}{10}$$



So, $\frac{1}{2} - \frac{1}{10} = \frac{4}{10}$. Written in simplest form, $\frac{4}{10} = \frac{2}{5}$.

Use fraction strips to find the difference. Write your answer in simplest form.

1. $\frac{7}{8} - \frac{1}{2}$

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

3. $\frac{5}{6} - \frac{1}{3}$

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

5. $\frac{9}{10} - \frac{4}{5}$

6. $\frac{2}{3} - \frac{5}{12}$

Subtraction with Unlike Denominators

Use fraction strips to find the difference. Write your answer in simplest form.

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

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

$$\underline{\frac{1}{6}}$$

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

$$\underline{\hspace{2cm}}$$

3. $\frac{7}{8} - \frac{1}{2}$

$$\underline{\hspace{2cm}}$$

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

$$\underline{\hspace{2cm}}$$

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

$$\underline{\hspace{2cm}}$$

6. $\frac{4}{5} - \frac{1}{2}$

$$\underline{\hspace{2cm}}$$

7. $\frac{3}{4} - \frac{1}{3}$

$$\underline{\hspace{2cm}}$$

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

$$\underline{\hspace{2cm}}$$

9. $\frac{7}{10} - \frac{1}{2}$

$$\underline{\hspace{2cm}}$$

10. $\frac{9}{10} - \frac{2}{5}$

$$\underline{\hspace{2cm}}$$

11. $\frac{5}{8} - \frac{1}{4}$

$$\underline{\hspace{2cm}}$$

12. $\frac{2}{3} - \frac{1}{2}$

$$\underline{\hspace{2cm}}$$

Problem Solving 

13. Amber had $\frac{3}{8}$ of a cake left after her party. She wrapped a piece that was $\frac{1}{4}$ of the original cake for her best friend. What fractional part did she have left for herself?

$$\underline{\hspace{2cm}}$$

14. Wesley bought $\frac{1}{2}$ pound of nails for a project. When he finished the project, he had $\frac{1}{4}$ pound of the nails left. How many pounds of nails did he use?

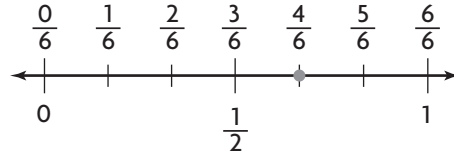
$$\underline{\hspace{2cm}}$$

Estimate Fraction Sums and Differences

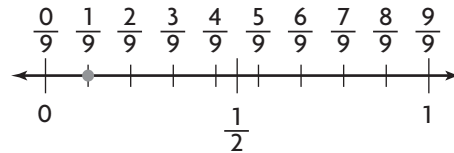
You can round fractions to 0, to $\frac{1}{2}$, or to 1 to estimate sums and differences.

Estimate the sum. $\frac{4}{6} + \frac{1}{9}$

Step 1 Find $\frac{4}{6}$ on the number line.
Is it closest to 0, $\frac{1}{2}$, or 1?
The fraction $\frac{4}{6}$ is closest to $\frac{1}{2}$.



Step 2 Find $\frac{1}{9}$ on the number line.
Is it closest to 0, $\frac{1}{2}$, or 1?
The fraction $\frac{1}{9}$ is closest to 0.

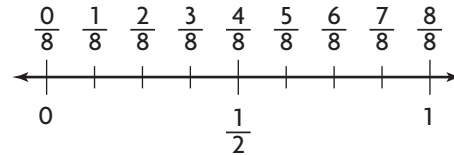
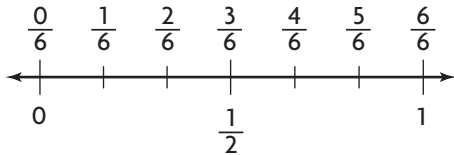


Step 3 To estimate the sum $\frac{4}{6} + \frac{1}{9}$,
add the two rounded numbers.

$$\frac{1}{2} + 0 = \frac{1}{2}$$

So, $\frac{4}{6} + \frac{1}{9}$ is about $\frac{1}{2}$.

Estimate the sum or difference.



1. $\frac{4}{6} + \frac{1}{8}$

2. $\frac{2}{6} + \frac{7}{8}$

3. $\frac{5}{6} - \frac{3}{8}$

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

5. $\frac{7}{8} - \frac{5}{6}$

6. $\frac{1}{6} + \frac{7}{8}$

Estimate Fraction Sums and Differences

Estimate the sum or difference.

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

2. $\frac{1}{8} + \frac{1}{4}$

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

Think: $\frac{1}{3}$ is closer
to $\frac{1}{2}$ than to 0.Estimate: 0

Estimate: _____

Estimate: _____

4. $2\frac{3}{5} - 1\frac{3}{8}$

5. $\frac{1}{5} + \frac{3}{7}$

6. $\frac{2}{5} + \frac{2}{3}$

Estimate: _____

Estimate: _____

Estimate: _____

7. $2\frac{2}{3} + \frac{3}{4}$

8. $1\frac{7}{8} - 1\frac{1}{2}$

9. $4\frac{1}{8} - \frac{3}{4}$

Estimate: _____

Estimate: _____

Estimate: _____

10. $3\frac{9}{10} - 1\frac{2}{5}$

11. $2\frac{5}{8} + 1\frac{1}{4}$

12. $1\frac{1}{3} - \frac{1}{4}$

Estimate: _____

Estimate: _____

Estimate: _____

Problem Solving 

13. For a fruit salad recipe, Jenna combined $\frac{3}{8}$ cup of raisins, $\frac{7}{8}$ cup of oranges, and $\frac{3}{4}$ cup of apples. About how many cups of fruit are in the salad?

14. Tyler had $2\frac{7}{16}$ yards of fabric. He used $\frac{3}{4}$ yard to make a vest. About how much fabric did he have left?

Problem Solving • Practice Addition and Subtraction

Makayla walks for exercise. She wants to walk a total of 6 miles. On Monday, she walked $2\frac{5}{6}$ miles. On Tuesday, she walked $1\frac{1}{3}$ miles. How many more miles does Makayla need to walk to reach her goal?

Read the Problem	Solve the Problem
<p>What do I need to find?</p> <p>I need to find <u>the distance that Makayla needs to walk.</u></p>	<p>• Start with the equation.</p> $6 = 2\frac{5}{6} + 1\frac{1}{3} + x$ <hr/> <p>Subtraction is the inverse operation of addition.</p>
<p>What information do I need to use?</p> <p>I need to use <u>the distance she wants to walk</u> and <u>the distance she has already walked.</u></p>	<p>• Use subtraction to work backward and rewrite the equation.</p> $6 - 2\frac{5}{6} - 1\frac{1}{3} = x$ <hr/> <p>• Subtract to find the value of x.</p> $ \begin{array}{r} 6 = 5\frac{6}{6} \\ -2\frac{5}{6} = -2\frac{5}{6} \\ \hline 3\frac{1}{6} \end{array} \longrightarrow \begin{array}{r} 3\frac{1}{6} = 2\frac{7}{6} \\ -1\frac{1}{3} = -1\frac{2}{6} \\ \hline 1\frac{5}{6} \end{array} $
<p>How will I use the information?</p> <p>First <u>I can write an equation</u></p> $6 = 2\frac{5}{6} + 1\frac{1}{3} + x$ <hr/> <p>Then <u>I can work backward to solve the problem.</u></p>	<p>Estimate to show that your answer is reasonable.</p> $3 + 1 + 2 = 6$ <hr/> <p>So, Makayla has to walk <u>$1\frac{5}{6}$</u> more miles to reach her goal.</p>

1. Ben has $5\frac{3}{4}$ cups of sugar. He uses $\frac{2}{3}$ cup of sugar to make cookies. Then he uses $2\frac{1}{2}$ cups of sugar to make fresh lemonade. How many cups of sugar does Ben have left?
- _____

2. Cheryl has 5 ft of ribbon. She cuts a $3\frac{3}{4}$ -ft strip to make a hair bow. Then she cuts a $\frac{5}{6}$ -ft strip for a border on a scrapbook page. Is there enough ribbon for Cheryl to cut two $\frac{1}{3}$ -ft pieces to put on a picture frame? **Explain.**
- _____
- _____

Problem Solving • Practice Addition and Subtraction

Read each problem and solve.

1. From a board 8 feet in length, Emmet cut two $2\frac{1}{3}$ -foot bookshelves. How much of the board remained?

Write an equation: $8 = 2\frac{1}{3} + 2\frac{1}{3} + x$

Rewrite the equation to work backward:

$$8 - 2\frac{1}{3} - 2\frac{1}{3} = x$$

Subtract twice to find the length remaining: $3\frac{1}{3}$ feet

2. Lynne bought a bag of grapefruit, $1\frac{5}{8}$ pounds of apples, and $2\frac{3}{16}$ pounds of bananas. The total weight of her purchases was $7\frac{1}{2}$ pounds. How much did the bag of grapefruit weigh?

3. Mattie's house consists of two stories and an attic. The first floor is $8\frac{5}{6}$ feet tall, the second floor is $8\frac{1}{2}$ feet tall, and the entire house is $24\frac{1}{3}$ feet tall. How tall is the attic?

4. It is $10\frac{3}{5}$ miles from Alston to Barton and $12\frac{1}{2}$ miles from Barton to Chester. The distance from Alston to Durbin, via Barton and Chester, is 35 miles. How far is it from Chester to Durbin?

5. Marcie bought a 50-foot roll of packing tape. She used two $8\frac{5}{6}$ -foot lengths. How much tape is left on the roll?

6. Meg started her trip with $11\frac{1}{2}$ gallons of gas in her car's gas tank. She bought an additional $6\frac{4}{5}$ gallons on her trip and arrived back home with $3\frac{3}{10}$ gallons left. How much gas did she use on the trip?

Lesson Objective: Solve division problems and decide when to write a remainder as a fraction.

Name _____

Interpret the Remainder

Erin has 87 ounces of trail mix. She puts an equal number of ounces in each of 12 bags. How many ounces does she put in each bag?

$$\begin{array}{r} 7 \text{ r}3 \\ 12 \overline{)87} \\ \underline{-84} \\ 3 \end{array}$$

First, divide to find the quotient and remainder. Then, decide how to use the quotient and the remainder to answer the question.

- The dividend, $\underline{87}$, represents the total number of ounces of trail mix.
- The divisor, $\underline{12}$, represents the total number of bags.
- The quotient, $\underline{7}$, represents the whole-number part of the number of ounces in each bag.
- The remainder, $\underline{3}$, represents the number of ounces left over.

Divide the 3 ounces in the remainder by the divisor, 12, to write the remainder as a fraction: $\underline{\frac{3}{12}}$

Write the fraction part in simplest form in your answer.

So, Erin puts $\underline{7\frac{1}{4}}$ ounces of trail mix in each bag.

Interpret the remainder to solve.

1. Harry goes on a canoe trip with his scout troop. They will canoe a total of 75 miles and want to travel 8 miles each day. How many days will they need to travel the entire distance?
2. Hannah and her family want to hike 8 miles per day along a 125-mile-long trail. How many days will Hannah and her family hike exactly 8 miles?

3. There are 103 students eating lunch in the cafeteria. Each table seats 4 students. All the tables are full, except for one table. How many students are sitting at the table that is not full?
4. Emily buys 240 square feet of carpet. She can convert square feet to square yards by dividing the number of square feet by 9. How many square yards of carpet did Emily buy? (Hint: Write the remainder as a fraction.)

Interpret the Remainder

Interpret the remainder to solve.

- Warren spent 140 hours making 16 wooden toy trucks for a craft fair. If he spent the same amount of time making each truck, how many hours did he spend making each truck?
- Marcia has 412 bouquets of flowers for centerpieces. She uses 8 flowers for each centerpiece. How many centerpieces can she make?

$$\begin{array}{r} 8 \\ 16 \overline{)140} \\ \underline{-128} \\ 12 \end{array}$$

$8\frac{3}{4}$ hours

- On the 5th grade class picnic, 50 students share 75 sandwiches equally. How many sandwiches does each student get?
 - One plant container holds 14 tomato seedlings. If you have 1,113 seedlings, how many containers do you need to hold all the seedlings?
-

Problem Solving 

- Fiona bought 212 stickers to make a sticker book. If she places 18 stickers on each page, how many pages will her sticker book have?
 - Jenny has 220 ounces of cleaning solution that she wants to divide equally among 12 large containers. How much cleaning solution should she put in each container?
-

Lesson Objective: Interpret a fraction as division and solve whole-number division problems that result in a fraction or mixed number.

Name _____

Connect Fractions to Division

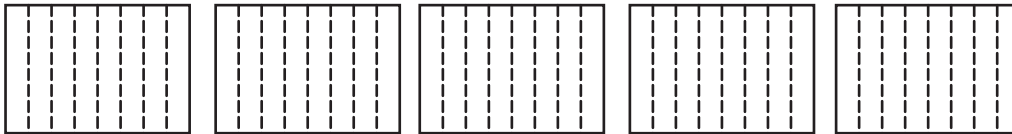
You can write a fraction as a division expression.

$$\frac{4}{5} = 4 \div 5 \qquad \frac{15}{3} = 15 \div 3$$

There are 8 students in a wood-working class and 5 sheets of plywood for them to share equally. What fraction of a sheet of plywood will each student get?

Divide. $5 \div 8$ **Use a drawing.**

Step 1 Draw 5 rectangles to represent 5 sheets of plywood. Since there are 8 students, draw lines to divide each piece of plywood into eighths.



Each student's share of 1 sheet of plywood is $\frac{1}{8}$.

Step 2 Count the total number of eighths each student gets.

Since there are 5 sheets of plywood, each student will get 5 of the eighths, or $\frac{5}{8}$.

Step 3 Complete the number sentence.

$$5 \div 8 = \frac{5}{8}$$

Step 4 Check your answer.

Since $\frac{5}{8} \times 8 = 5$, the quotient is correct.

So, each student will get $\frac{5}{8}$ of a sheet of plywood.

Complete the number sentence to solve.

- Ten friends share 6 pizzas equally. What fraction of a pizza does each friend get?
- Four students share 7 sandwiches equally. How much of a sandwich does each student get?

$$6 \div 10 = \underline{\hspace{2cm}}$$

$$7 \div 4 = \underline{\hspace{2cm}}$$

Connect Fractions to Division

Complete the number sentence to solve.

1. Six students share 8 apples equally. How many apples does each student get?

$$8 \div 6 = \underline{\frac{8}{6}, \text{ or } 1\frac{1}{3}}$$

2. Ten boys share 7 cereal bars equally. What fraction of a cereal bar does each boy get?

$$7 \div 10 = \underline{\hspace{2cm}}$$

3. Eight friends share 12 pies equally. How many pies does each friend get?

$$12 \div 8 = \underline{\hspace{2cm}}$$

4. Three girls share 8 yards of fabric equally. How many yards of fabric does each girl get?

$$8 \div 3 = \underline{\hspace{2cm}}$$

5. Five bakers share 2 loaves of bread equally. What fraction of a loaf of bread does each baker get?

$$2 \div 5 = \underline{\hspace{2cm}}$$

6. Nine friends share 6 cookies equally. What fraction of a cookie does each friend get?

$$6 \div 9 = \underline{\hspace{2cm}}$$

7. Twelve students share 3 pizzas equally. What fraction of a pizza does each student get?

$$3 \div 12 = \underline{\hspace{2cm}}$$

8. Three sisters share 5 sandwiches equally. How many sandwiches does each sister get?

$$5 \div 3 = \underline{\hspace{2cm}}$$

Problem Solving

9. There are 12 students in a jewelry-making class and 8 sets of charms. What fraction of a set of charms will each student get?

10. Five friends share 6 cheesecakes equally. How many cheesecakes will each friend get?

Name _____

Find Part of a Group

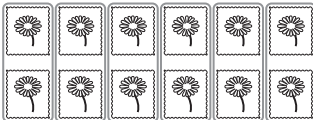
Lauren bought 12 stamps for postcards. She gave Brianna $\frac{1}{6}$ of them. How many stamps did Lauren give to Brianna?



Find $\frac{1}{6}$ of 12.

Step 1 What is the denominator in the fraction of the stamps Lauren gave to Brianna? **6**

So, divide the 12 stamps into 6 equal groups. Circle the groups.



Step 2 Each group represents $\frac{1}{6}$ of the stamps.

How many stamps are in 1 group? **2**

So, $\frac{1}{6}$ of 12 is 2, or $\frac{1}{6} \times 12$ is 2.

So, Lauren gave Brianna 2 stamps.

Use a model to solve.

1. $\frac{3}{4} \times 12 =$ _____

2. $\frac{1}{3} \times 9 =$ _____

3. $\frac{3}{5} \times 20 =$ _____

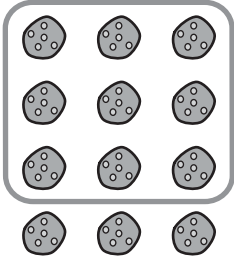
4. $\frac{4}{6} \times 18 =$ _____

Find Part of a Group

Use a model to solve.

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

2. $\frac{7}{8} \times 16 = \underline{\hspace{2cm}}$



3. $\frac{6}{10} \times 10 = \underline{\hspace{2cm}}$

4. $\frac{2}{3} \times 9 = \underline{\hspace{2cm}}$

5. $\frac{1}{6} \times 18 = \underline{\hspace{2cm}}$

6. $\frac{4}{5} \times 10 = \underline{\hspace{2cm}}$

Problem Solving 

7. Marco drew 20 pictures. He drew $\frac{3}{4}$ of them in art class. How many pictures did Marco draw in art class?

8. Caroline has 10 marbles. One half of them are blue. How many of Caroline's marbles are blue?

Name _____

Multiply Fractions and Whole Numbers

Find the product. $\frac{3}{8} \times 4$

Step 1 Draw 4 rectangles to represent the factor 4.



Step 2 The denominator of the factor $\frac{3}{8}$ is 8. So, divide the 4 rectangles into 8 equal parts.



Step 3 The numerator of the factor $\frac{3}{8}$ is 3. So, shade 3 of the parts.



Step 4 The 4 rectangles have 3 shaded parts. Each rectangle is divided into 2 equal parts. So, $\frac{3}{2}$ of the rectangles are shaded.

So, $\frac{3}{8} \times 4$ is $\frac{3}{2}$, or $1\frac{1}{2}$.

Find the product.

1. $\frac{5}{12} \times 4 =$ _____

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

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

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

5. $\frac{9}{10} \times 5 =$ _____

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

7. $\frac{7}{12} \times 6 =$ _____

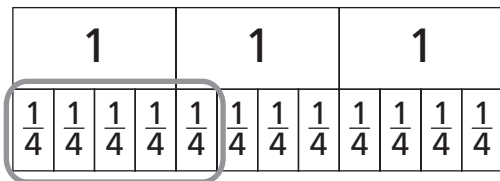
8. $12 \times \frac{2}{9} =$ _____

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

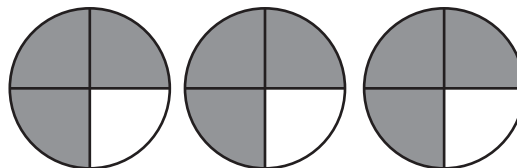
Multiply Fractions and Whole Numbers

Use the model to find the product.

1. $\frac{5}{12} \times 3 = \frac{5}{4}$, or $1\frac{1}{4}$



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



Find the product.

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

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

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

6. $7 \times \frac{5}{6} =$ _____

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

8. $9 \times \frac{2}{3} =$ _____

Problem Solving REAL WORLD

9. Jody has a 5-pound bag of potatoes. She uses $\frac{4}{5}$ of the bag to make potato salad. How many pounds of potatoes does Jody use for the potato salad?

10. Lucas lives $\frac{5}{8}$ mile from school. Kenny lives twice as far as Lucas from school. How many miles does Kenny live from school?

Fraction and Whole Number Multiplication**Find the product.** $3 \times \frac{5}{6}$

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

Write the whole-number factor, 3, as $\frac{3}{1}$.

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

Multiply the numerators. Then multiply the denominators.

$$= \frac{\boxed{15}}{6}$$

$$= \boxed{2} \frac{3}{6}, \text{ or } 2 \frac{\boxed{1}}{\boxed{2}}$$

Write the product as a mixed number in simplest form.

So, $3 \times \frac{5}{6}$ is $2\frac{1}{2}$.**Find the product. Write the product in simplest form.**

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

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

$$= \frac{\square \times \square}{\square \times \square}$$

$$= \frac{\square}{\square}, \text{ or } \underline{\hspace{2cm}}$$

3. $6 \times \frac{3}{4} = \underline{\hspace{2cm}}$

4. $\frac{4}{9} \times 3 = \underline{\hspace{2cm}}$

5. $5 \times \frac{3}{8} = \underline{\hspace{2cm}}$

6. $9 \times \frac{2}{3} = \underline{\hspace{2cm}}$

7. $2 \times \frac{5}{6} = \underline{\hspace{2cm}}$

8. $7 \times \frac{4}{10} = \underline{\hspace{2cm}}$

Fraction and Whole Number Multiplication

Find the product. Write the product in simplest form.

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

2. $\frac{2}{9} \times 3 = \underline{\hspace{2cm}}$

3. $\frac{4}{5} \times 10 = \underline{\hspace{2cm}}$

$4 \times \frac{5}{8} = \frac{20}{8}$

$\frac{20}{8} = 2\frac{4}{8}, \text{ or } 2\frac{1}{2}$

4. $\frac{3}{4} \times 9 = \underline{\hspace{2cm}}$

5. $8 \times \frac{5}{6} = \underline{\hspace{2cm}}$

6. $7 \times \frac{1}{2} = \underline{\hspace{2cm}}$

7. $\frac{2}{5} \times 6 = \underline{\hspace{2cm}}$

8. $9 \times \frac{2}{3} = \underline{\hspace{2cm}}$

9. $\frac{3}{10} \times 9 = \underline{\hspace{2cm}}$

10. $4 \times \frac{3}{8} = \underline{\hspace{2cm}}$

11. $\frac{3}{5} \times 7 = \underline{\hspace{2cm}}$

12. $\frac{1}{8} \times 6 = \underline{\hspace{2cm}}$

Problem Solving 

13. Leah makes aprons to sell at a craft fair. She needs $\frac{3}{4}$ yard of material to make each apron. How much material does Leah need to make 6 aprons?

14. The gas tank of Mr. Tanaka's car holds 15 gallons of gas. He used $\frac{2}{3}$ of a tank of gas last week. How many gallons of gas did Mr. Tanaka use?

Fraction Multiplication

To multiply fractions, you can multiply the numerators, then multiply the denominators. Write the product in simplest form.

Multiply. $\frac{3}{10} \times \frac{4}{5}$

Step 1 Multiply the numerators. Multiply the denominators.

$$\begin{aligned}\frac{3}{10} \times \frac{4}{5} &= \frac{3 \times 4}{10 \times 5} \\ &= \frac{12}{50}\end{aligned}$$

Step 2 Write the product in simplest form.

$$\begin{aligned}\frac{12}{50} &= \frac{12 \div 2}{50 \div 2} \\ &= \frac{6}{25}\end{aligned}$$

So, $\frac{3}{10} \times \frac{4}{5}$ is $\frac{6}{25}$.

Find the product. Write the product in simplest form.

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

2. $\frac{4}{7} \times \frac{5}{12}$

3. $\frac{3}{8} \times \frac{2}{9}$

4. $\frac{4}{5} \times \frac{5}{8}$

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

6. $\frac{3}{4} \times 8$

7. $\frac{5}{8} \times \frac{2}{3}$

8. $\frac{5}{6} \times \frac{3}{8}$

Fraction Multiplication

Find the product. Write the product in simplest form.

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

$$= \frac{28}{40}$$

$$= \frac{7}{10}$$

2. $3 \times \frac{1}{6}$

3. $\frac{5}{9} \times \frac{3}{4}$

4. $\frac{4}{7} \times \frac{1}{2}$

5. $\frac{1}{8} \times 20$

6. $\frac{4}{5} \times \frac{3}{8}$

7. $\frac{6}{7} \times \frac{7}{9}$

8. $8 \times \frac{1}{9}$

9. $\frac{1}{14} \times 28$

10. $\frac{3}{4} \times \frac{1}{3}$

11. Karen raked $\frac{3}{5}$ of the yard. Minni raked $\frac{1}{3}$ of the amount Karen raked. How much of the yard did Minni rake?

12. In the pet show, $\frac{3}{8}$ of the pets are dogs. Of the dogs, $\frac{2}{3}$ have long hair. What fraction of the pets are dogs with long hair?

Algebra Evaluate for the given value of the variable.

13. $\frac{7}{8} \times c$ for $c = 8$

14. $t \times \frac{3}{4}$ for $t = \frac{8}{9}$

15. $\frac{1}{2} \times s$ for $s = \frac{3}{10}$

16. $y \times 6$ for $y = \frac{2}{3}$

Problem Solving 

17. Jason ran $\frac{5}{7}$ of the distance around the school track. Sara ran $\frac{4}{5}$ of Jason's distance. What fraction of the total distance around the track did Sara run?

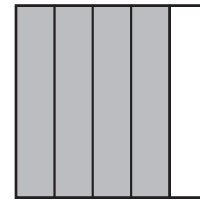
18. A group of students attend a math club. Half of the students are boys and $\frac{4}{9}$ of the boys have brown eyes. What fraction of the group are boys with brown eyes?

Multiply Fractions

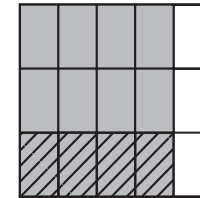
You can use a model to help you multiply two fractions.

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

Step 1 Draw a rectangle. Divide it into 5 equal columns. To represent the factor $\frac{4}{5}$, shade 4 of the 5 columns.



Step 2 Now divide the rectangle into 3 equal rows. Shade $\frac{1}{3}$ of the $\frac{4}{5}$ you already shaded.



The rectangle is divided into **15** smaller rectangles. This is the denominator of the product.

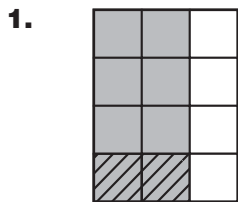
There are 4 smaller rectangles that contain both types of shading. So, **4** is the numerator of the product.

So $\frac{4}{15}$ of the rectangles contain both types of shading.

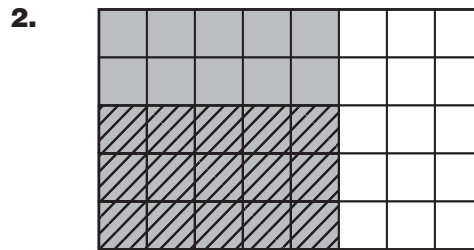
Think: What is $\frac{1}{3}$ of $\frac{4}{5}$?

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

Find the product. Draw a model.



$$\frac{1}{4} \times \frac{2}{3} = \underline{\hspace{2cm}}$$



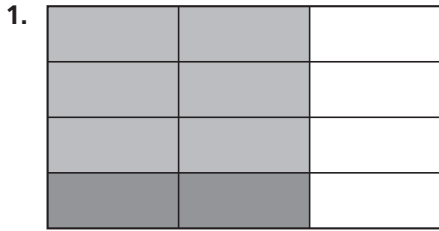
$$\frac{3}{5} \times \frac{5}{8} = \underline{\hspace{2cm}}$$

3.
$$\frac{2}{5} \times \frac{3}{4} = \underline{\hspace{2cm}}$$

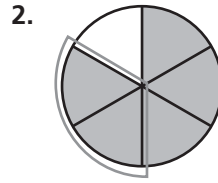
4.
$$\frac{2}{3} \times \frac{3}{8} = \underline{\hspace{2cm}}$$

Multiply Fractions

Find the product.



$$\frac{1}{4} \times \frac{2}{3} = \underline{\frac{2}{12}}, \text{ or } \underline{\frac{1}{6}}$$



$$\frac{2}{5} \times \frac{5}{6} = \underline{\hspace{2cm}}$$

Find the product. Draw a model.

3. $\frac{4}{5} \times \frac{1}{2} = \underline{\hspace{2cm}}$

4. $\frac{3}{4} \times \frac{1}{3} = \underline{\hspace{2cm}}$

5. $\frac{3}{8} \times \frac{2}{3} = \underline{\hspace{2cm}}$

6. $\frac{3}{5} \times \frac{3}{5} = \underline{\hspace{2cm}}$

Problem Solving 

7. Nora has a piece of ribbon that is $\frac{3}{4}$ yard long. She will use $\frac{1}{2}$ of it to make a bow. What length of the ribbon will she use for the bow?

8. Marlon bought $\frac{7}{8}$ pound of turkey at the deli. He used $\frac{2}{3}$ of it to make sandwiches for lunch. How much of the turkey did Marlon use for sandwiches?

Lesson Objective: Use a model to multiply two mixed numbers and find the area of a rectangle.

Area and Mixed Numbers

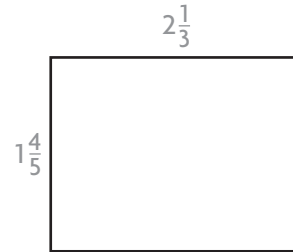
You can use an area model to help you multiply mixed numbers.

Find the area. $1\frac{4}{5} \times 2\frac{1}{3}$

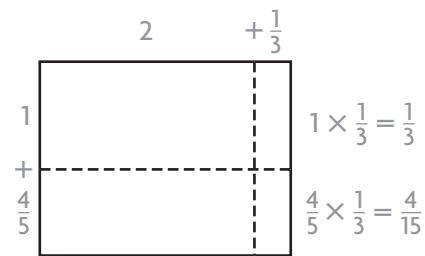
Step 1 Rewrite each mixed-number factor as the sum of a whole number and a fraction.

$$1\frac{4}{5} = 1 + \frac{4}{5} \text{ and } 2\frac{1}{3} = 2 + \frac{1}{3}$$

Step 2 Draw an area model to show the original multiplication problem.



Step 3 Draw dashed lines, and label each section to show how you broke apart the mixed numbers in Step 1.



Step 4 Find the area of each section.

$$1 \times 2 = \underline{2}$$

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

$$\frac{4}{5} \times 2 = \underline{\frac{8}{5}}$$

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

Step 5 Add the areas of each of the sections to find the total area of the rectangle.

$$2 + \frac{1}{3} + \frac{8}{5} + \frac{4}{15} = \frac{30}{15} + \frac{5}{15} + \frac{24}{15} + \frac{4}{15}$$

$$= \frac{63}{15}, \text{ or } \underline{4\frac{1}{5}}$$

So, $1\frac{4}{5} \times 2\frac{1}{3}$ is $\underline{4\frac{1}{5}}$.

Use an area model to solve.

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

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

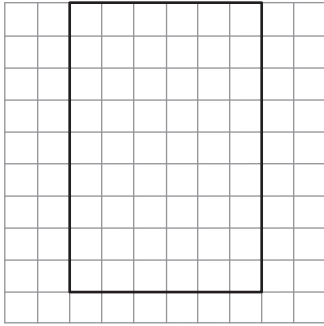
3. $2\frac{1}{2} \times 1\frac{1}{3}$

Area and Mixed Numbers

Use the grid to find the area.

1. Let each square represent $\frac{1}{4}$ unit by $\frac{1}{4}$ unit.

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



54 squares cover the diagram.

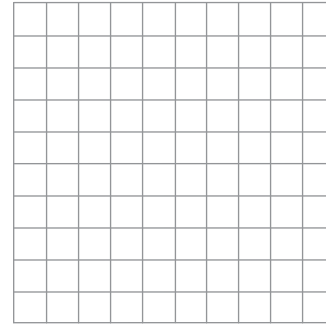
Each square is $\frac{1}{16}$ square unit.

The area of the diagram is

$$54 \times \frac{1}{16} = \frac{54}{16} = 3\frac{3}{8} \text{ square units.}$$

2. Let each square represent $\frac{1}{3}$ unit by $\frac{1}{3}$ unit.

$$1\frac{2}{3} \times 2\frac{1}{3} = \underline{\hspace{2cm}}$$



The area is _____ square units.

Use an area model to solve.

3. $1\frac{1}{8} \times 2\frac{1}{2}$

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

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

Problem Solving



6. Ava's bedroom rug is $2\frac{3}{4}$ feet long and $2\frac{1}{2}$ feet wide. What is the area of the rug?

7. A painting is $2\frac{2}{3}$ feet long and $1\frac{1}{2}$ feet high. What is the area of the painting?

Name _____

Lesson Objective: Relate the size of the product compared to the size of one factor when multiplying fractions.

Compare Fraction Factors and Products

You can use a model to determine how the size of the product compares to the size of one factor when multiplying fractions.

The factor is 1: $\frac{2}{3} \times 1$

- Draw a model to represent the factor 1.
Divide it into 3 equal sections.

- Shade 2 of the 3 sections to represent the factor $\frac{2}{3}$.

$\frac{2}{3}$ of the rectangle is shaded. So, $\frac{2}{3} \times 1$ is equal to $\frac{2}{3}$.

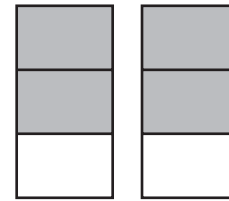


The factor is greater than 1: $\frac{2}{3} \times 2$

- Draw two rectangles to represent the factor 2.
Divide each rectangle into 3 equal sections.

- Shade 2 of 3 sections in each to represent the factor $\frac{2}{3}$.

In all, 4 sections are shaded, which is greater than the number of sections in one rectangle. So, $\frac{2}{3} \times 2$ is greater than $\frac{2}{3}$.



The factor is less than 1: $\frac{2}{3} \times \frac{1}{6}$

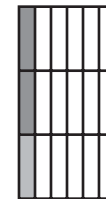
- Draw a rectangle. Divide it into 6 equal columns.

Shade 1 of the 6 columns to represent the factor $\frac{1}{6}$.

- Now divide the rectangle into 3 equal rows. Shade 2 of the 3 rows of the section already shaded to represent the factor $\frac{2}{3}$.

The rectangle is divided into 18 sections. 2 of the sections are shaded twice. 2 sections is less than the 3 sections that represent $\frac{1}{6}$.

So, $\frac{2}{3} \times \frac{1}{6}$ is less than $\frac{1}{6}$.



Complete the statement with *equal to*, *greater than*, or *less than*.

1. $\frac{3}{7} \times \frac{2}{5}$ will be _____ $\frac{3}{7}$.

2. $\frac{7}{8} \times 3$ will be _____ $\frac{7}{8}$.

3. $\frac{1}{6} \times \frac{5}{5}$ will be _____ $\frac{1}{6}$.

4. $5 \times \frac{6}{7}$ will be _____ 5.

Compare Fraction Factors and ProductsComplete the statement with *equal to*, *greater than*, or *less than*.

1. $\frac{3}{5} \times \frac{4}{7}$ will be **less than** $\frac{4}{7}$. 2. $5 \times \frac{7}{8}$ will be _____ $\frac{7}{8}$.

Think: $\frac{4}{7}$ is multiplied by a number less than 1;
so, $\frac{3}{5} \times \frac{4}{7}$ will be less than $\frac{4}{7}$.

3. $6 \times \frac{2}{5}$ will be _____ $\frac{2}{5}$. 4. $\frac{1}{9} \times 1$ will be _____ $\frac{1}{9}$.

5. $\frac{7}{8} \times \frac{3}{5}$ will be _____ $\frac{3}{5}$. 6. $\frac{4}{5} \times \frac{7}{7}$ will be _____ $\frac{4}{5}$.

Problem Solving

7. Starla is making hot cocoa. She plans to multiply the recipe by 4 to make enough hot cocoa for the whole class. If the recipe calls for $\frac{1}{2}$ teaspoon vanilla extract, will she need more than $\frac{1}{2}$ teaspoon or less than $\frac{1}{2}$ teaspoon of vanilla extract to make all the hot cocoa?
8. Miles is planning to spend $\frac{2}{3}$ as many hours bicycling this week as he did last week. Is Miles going to spend more hours or fewer hours bicycling this week than last week?

Lesson Objective: Relate the size of the product to the factors when multiplying fractions greater than one.

Name _____

Compare Mixed Number Factors and Products

Complete each statement with *equal to*, *greater than*, or *less than*.

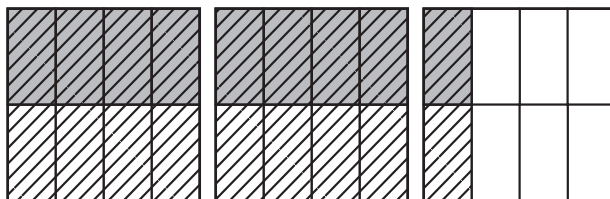
$$1 \times 1\frac{3}{4} \text{ is } \underline{\quad? \quad} 1\frac{3}{4}.$$

The Identity Property of Multiplication states that the product of

1 and any number is that number. So, $1 \times 1\frac{3}{4}$ is equal to $1\frac{3}{4}$.

$$\frac{1}{2} \times 2\frac{1}{4} \text{ is } \underline{\quad? \quad} 2\frac{1}{4}.$$

Draw three rectangles. Divide each rectangle into 4 equal columns.



Shade completely the first two rectangles and one column of the last rectangle to represent $\frac{1}{4}$.

Divide the rectangles into 2 rows. Shade one row to represent the factor $\frac{1}{2}$.

18 small rectangles are shaded. 9 rectangles have both types of shading. 9 rectangles is less than the 18 rectangles that represent $2\frac{1}{4}$.

$$\text{So, } \frac{1}{2} \times 2\frac{1}{4} \text{ is } \underline{\text{less than}} 2\frac{1}{4}.$$

When you multiply a mixed number by a fraction less than 1,

the product will be less than the mixed number.

$$1\frac{1}{4} \times 1\frac{3}{4} \text{ is } \underline{\quad? \quad} 1\frac{1}{4}.$$

Use what you know about the product of two whole numbers greater than 1 to determine the size of the product of two mixed numbers.

$$\text{So, } 1\frac{1}{4} \times 1\frac{3}{4} \text{ is } \underline{\text{greater than}} 1\frac{1}{4} \text{ and } \underline{\text{greater than}} 1\frac{3}{4}.$$

When you multiply two mixed numbers, their product is greater than either factor.

Complete the statement with *equal to*, *greater than*, or *less than*.

1. $\frac{3}{5} \times 1\frac{2}{7}$ is _____ $1\frac{2}{7}$.

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

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

4. $\frac{8}{9} \times 4\frac{3}{4}$ is _____ $4\frac{3}{4}$.

Compare Mixed Number Factors and ProductsComplete the statement with *equal to*, *greater than*, or *less than*.

1. $\frac{2}{3} \times 1\frac{5}{8}$ will be **less than** $1\frac{5}{8}$. 2. $\frac{5}{5} \times 2\frac{3}{4}$ will be _____ $2\frac{3}{4}$.

Think: $1 \times 1\frac{5}{8}$ is $1\frac{5}{8}$.Since $\frac{2}{3}$ is less than 1, $\frac{2}{3} \times 1\frac{5}{8}$ will be less than $1\frac{5}{8}$.

3. $3 \times 3\frac{2}{7}$ will be _____ $3\frac{2}{7}$. 4. $9 \times 1\frac{4}{5}$ will be _____ $1\frac{4}{5}$.

5. $1\frac{7}{8} \times 2\frac{3}{8}$ will be _____ $2\frac{3}{8}$. 6. $3\frac{4}{9} \times \frac{5}{9}$ will be _____ $3\frac{4}{9}$.

Problem Solving

7. Fraser is making a scale drawing of a dog house. The dimensions of the drawing will be $\frac{1}{8}$ of the dimensions of the actual doghouse. The height of the actual doghouse is $36\frac{3}{4}$ inches. Will the dimensions of Fraser's drawing be equal to, greater than, or less than the dimensions of the actual dog house?
- _____

8. Jorge has a recipe that calls for $2\frac{1}{3}$ cups of flour. He plans to make $1\frac{1}{2}$ times the recipe. Will the amount of flour Jorge needs be equal to, greater than, or less than the amount of flour his recipe calls for?
- _____

Name _____

Problem Solving • Find Unknown Lengths

Zach built a rectangular deck in his backyard. The area of the deck is 300 square feet. The length of the deck is $1\frac{1}{3}$ times as long as the width. What are the dimensions of the deck?

Read the Problem			
<p>What do I need to find? I need to find <u>the dimensions of the deck</u>.</p>	<p>What information do I need to use? The deck has an area of <u>300</u> square feet, and the length is <u>$1\frac{1}{3}$</u> as long as the width.</p>	<p>How will I use the information? I will <u>guess</u> the length and width of the deck. Then I will <u>check</u> my guess and <u>revise</u> it if it is not correct.</p>	
Solve the Problem			
<p>I can try different values for the length of the deck, each that is $1\frac{1}{3}$ times as long as the width. Then I can multiply the length and width and compare to the correct area.</p>			
Guess	Length (in feet) ($1\frac{1}{3}$ times the width)	Check	Revise
12	$1\frac{1}{3} \times 12 = \underline{16}$	$12 \times 16 = \underline{192}$ too low	Try a <u>longer</u> width.
18	$1\frac{1}{3} \times 18 = \underline{24}$	$18 \times 24 = \underline{432}$ too high	Try a <u>shorter</u> width.
15	$1\frac{1}{3} \times 15 = \underline{20}$	$15 \times 20 = \underline{300}$ correct	
<p>So, the dimensions of the deck are <u>20</u> feet by <u>15</u> feet.</p>			

1. Abigail made a quilt that has an area of 4,800 square inches. The length of the quilt is $1\frac{1}{3}$ times the width of the quilt. What are the dimensions of the quilt?

2. The width of the mirror in Shannon's bathroom is $\frac{4}{9}$ its length. The area of the mirror is 576 square inches. What are the dimensions of the mirror?

Problem Solving • Find Unknown Lengths

1. Kamal's bedroom has an area of 120 square feet. The width of the room is $\frac{5}{6}$ the length of the room. What are the dimensions of Kamal's bedroom?

Guess: $6 \times 20 = 120$

Check: $\frac{5}{6} \times 20 = 16\frac{2}{3}$; try a longer width.

Guess: $10 \times 12 = 120$

Check: $\frac{5}{6} \times 12 = 10$. Correct!

10 feet by 12 feet

2. Marisol is painting on a piece of canvas that has an area of 180 square inches. The length of the painting is $1\frac{1}{4}$ times the width. What are the dimensions of the painting?
-

3. A small plane is flying a banner in the shape of a rectangle. The area of the banner is 144 square feet. The width of the banner is $\frac{1}{4}$ the length of the banner. What are the dimensions of the banner?
-

4. An artificial lake is in the shape of a rectangle and has an area of $\frac{9}{20}$ square mile. The width of the lake is $\frac{1}{5}$ the length of the lake. What are the dimensions of the lake?
-

Multiply Mixed Numbers

You can use a multiplication square to multiply mixed numbers.

Multiply. $1\frac{2}{7} \times 1\frac{3}{4}$ Write the product in simplest form.

Step 1 Write the mixed numbers outside the square.

×	1	$\frac{2}{7}$
1		
$\frac{3}{4}$		

Step 2 Multiply the number in each column by the number in each row.

×	1	$\frac{2}{7}$
1	1×1	$\frac{2}{7} \times 1$
$\frac{3}{4}$	$1 \times \frac{3}{4}$	$\frac{2}{7} \times \frac{3}{4}$

Step 3 Write each product inside the square.

×	1	$\frac{2}{7}$
1	1	$\frac{2}{7}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{14}$

Step 4 Add the products inside the multiplication square.

$$1 + \frac{2}{7} + \frac{3}{4} + \frac{3}{14}$$

Find the least common denominator.

$$\frac{28}{28} + \frac{8}{28} + \frac{21}{28} + \frac{6}{28} = \frac{63}{28}$$

Simplify.

$$\frac{63}{28} = 2\frac{7}{28}, \text{ or } 2\frac{1}{4}$$

So, $1\frac{2}{7} \times 1\frac{3}{4}$ is $2\frac{1}{4}$.

Find the product. Write the product in simplest form.

1. $2\frac{5}{8} \times 1\frac{1}{7}$

2. $3\frac{1}{2} \times 12$

3. $10\frac{5}{6} \times \frac{3}{5}$

4. $7\frac{7}{10} \times \frac{10}{11}$

Use the Distributive Property to find the product.

5. $12 \times 2\frac{1}{2}$

6. $15 \times 5\frac{1}{3}$

Multiply Mixed Numbers

Find the product. Write the product in simplest form.

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

2. $1\frac{1}{7} \times 1\frac{3}{4}$

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

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

$$1\frac{2}{3} \times 4\frac{2}{5} = \frac{5}{3} \times \frac{22}{5}$$

$$= \frac{110}{15} = \frac{22}{3}$$

$$= 7\frac{1}{3}$$

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

6. $7\frac{1}{5} \times 2\frac{1}{6}$

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

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

Use the Distributive Property to find the product.

9. $4\frac{2}{5} \times 10$

10. $26 \times 2\frac{1}{2}$

11. $6 \times 3\frac{2}{3}$

Problem Solving

12. Jake can carry $6\frac{1}{4}$ pounds of wood in from the barn. His father can carry $1\frac{5}{7}$ times as much as Jake. How many pounds can Jake's father carry?

13. A glass can hold $3\frac{1}{3}$ cups of water. A bowl can hold $2\frac{3}{5}$ times the amount in the glass. How many cups can a bowl hold?

Name _____

COMMON CORE STANDARDS
CC.5.NF.7a, CC.5.NF.7b

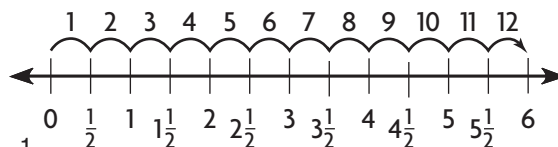
Lesson Objective: Divide a whole number by a fraction and divide a fraction by a whole number.

Divide Fractions and Whole Numbers

You can use a number line to help you divide a whole number by a fraction.

Divide. $6 \div \frac{1}{2}$

Step 1 Draw a number line from 0 to 6. Divide the number line into halves. Label each half on your number line, starting with $\frac{1}{2}$.



Step 2 Skip count by halves from 0 to 6 to find $6 \div \frac{1}{2}$.

Step 3 Count the number of skips. It takes **12** skips to go from 0 to 6. So the quotient is 12.

$$6 \div \frac{1}{2} = \underline{12} \text{ because } \underline{12} \times \frac{1}{2} = 6.$$

You can use fraction strips to divide a fraction by a whole number.

Divide. $\frac{1}{2} \div 5$

Step 1 Place a $\frac{1}{2}$ strip under a 1-whole strip.

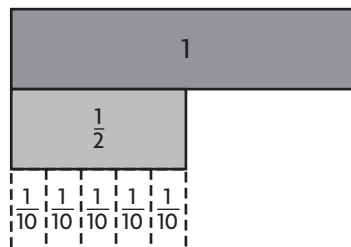
Step 2 Find 5 fraction strips, all with the same denominator, that fit exactly under the $\frac{1}{2}$ strip.

Each part is $\frac{1}{10}$ of the whole.

Step 3 Record and check the quotient.

$$\frac{1}{2} \div 5 = \underline{\frac{1}{10}} \text{ because } \underline{\frac{1}{10}} \times 5 = \frac{1}{2}.$$

So, $\frac{1}{2} \div 5 = \underline{\frac{1}{10}}$.



Divide. Draw a number line or use fraction strips.

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

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

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

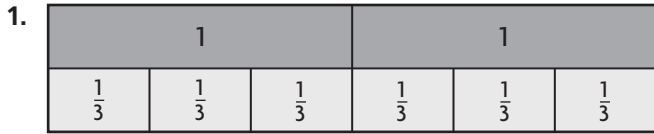
4. $\frac{1}{5} \div 3 =$ _____

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

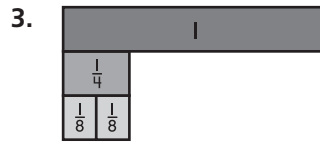
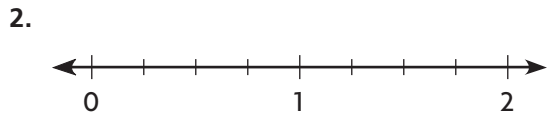
6. $4 \div \frac{1}{5} =$ _____

Divide Fractions and Whole Numbers

Divide and check the quotient.



$2 \div \frac{1}{3} = \underline{6}$ because $\underline{6} \times \frac{1}{3} = 2$.



$2 \div \frac{1}{4} = \underline{\quad}$ because $\underline{\quad} \times \frac{1}{4} = 2$.

$\frac{1}{4} \div 2 = \underline{\quad}$ because $\underline{\quad} \times 2 = \frac{1}{4}$.

Divide. Draw a number line or use fraction strips.

4. $1 \div \frac{1}{5} = \underline{\quad}$

5. $\frac{1}{6} \div 3 = \underline{\quad}$

6. $4 \div \frac{1}{6} = \underline{\quad}$

7. $3 \div \frac{1}{3} = \underline{\quad}$

8. $\frac{1}{4} \div 6 = \underline{\quad}$

9. $5 \div \frac{1}{4} = \underline{\quad}$

Problem Solving

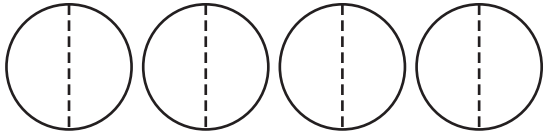
10. Amy can run $\frac{1}{10}$ mile per minute. How many minutes will it take Amy to run 3 miles?

11. Jeremy has 3 yards of ribbon to use for wrapping gifts. He cuts the ribbon into pieces that are $\frac{1}{4}$ yard long. How many pieces of ribbon does Jeremy have?

Name _____

Problem Solving • Use Multiplication

Nathan makes 4 batches of soup and divides each batch into halves. How many $\frac{1}{2}$ -batches of soup does he have?

Read the Problem	Solve the Problem
<p>What do I need to find? I need to find <u>the number of $\frac{1}{2}$-batches of soup Nathan has</u>.</p>	<p>Since Nathan makes 4 batches of soup, my diagram needs to show 4 circles to represent the 4 batches. I can divide each of the 4 circles in half.</p> 
<p>What information do I need to use? I need to use the size of each <u>batch of soup</u> and the total number of <u>batches</u> of soup Nathan makes.</p>	
<p>How will I use the information? I can <u>make a diagram</u> to organize the information from the problem. Then I can use the diagram to find <u>the number of $\frac{1}{2}$-batches of soup Nathan has after he divides the 4 batches of soup</u>.</p>	<p>To find the total number of halves in the 4 batches, I can multiply 4 by the number of halves in each circle.</p> $4 \div \frac{1}{2} = 4 \times \underline{2} = \underline{8}$ <p>So, Nathan has <u>8</u> one-half-batches of soup.</p>

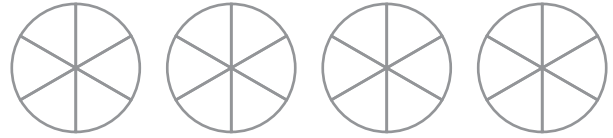
Draw a diagram to help you solve the problem.

- A nearby park has 8 acres of land to use for gardens. The park divides each acre into fourths. How many $\frac{1}{4}$ -acre gardens does the park have?

- Clarissa has 3 pints of ice tea that she divides into $\frac{1}{2}$ -pint servings. How many $\frac{1}{2}$ -pint servings does she have?

Problem Solving • Use Multiplication

1. Sebastian bakes 4 pies and cuts each pie into sixths. How many $\frac{1}{6}$ -pie slices does he have?



To find the total number of sixths in the 4 pies, multiply 4 by the number of sixths in each pie.

$$4 \div \frac{1}{6} = 4 \times 6 = 24 \text{ one-sixth-pie slices}$$

2. Ali has 2 vegetable pizzas that she cuts into eighths. How many $\frac{1}{8}$ -size pieces does she have?

3. A baker has 6 loaves of bread. Each loaf weighs 1 pound. He cuts each loaf into thirds. How many $\frac{1}{3}$ -pound loaves of bread does the chef now have?

4. Suppose the baker has 4 loaves of bread and cuts the loaves into halves. How many $\frac{1}{2}$ -pound loaves of bread would the baker have?

5. Madalyn has 3 watermelons that she cuts into halves to give to her neighbors. How many neighbors will get a $\frac{1}{2}$ -size piece of watermelon?

6. A landscaper had 5 tons of rock to build decorative walls. He used $\frac{1}{4}$ ton of rock for each wall. How many decorative walls did he build?

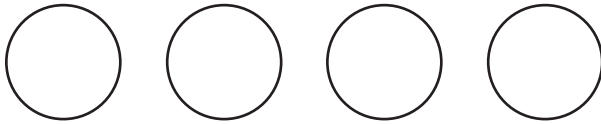
Lesson Objective: Divide a whole number by a fraction and divide a fraction by a whole number.

Fraction and Whole-Number Division

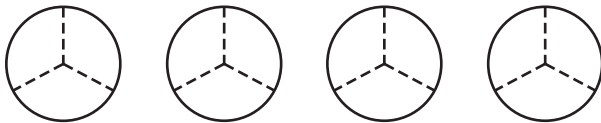
You can divide fractions by solving a related multiplication sentence.

Divide. $4 \div \frac{1}{3}$

Step 1 Draw 4 circles to represent the dividend, 4.



Step 2 Since the divisor is $\frac{1}{3}$, divide each circle into thirds.



Step 3 Count the total number of thirds.

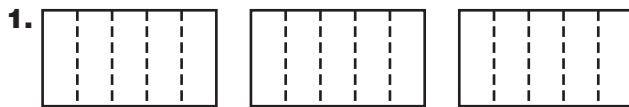
When you divide the 4 circles into thirds, you are finding the number of thirds in 4 circles, or finding 4 groups of 3.

There are 12 thirds.

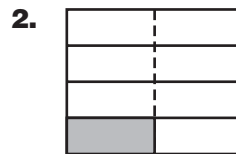
Step 4 Complete the number sentence.

$$4 \div \frac{1}{3} = 4 \times \underline{3} = \underline{12}$$

Use the model to complete the number sentence.



$$3 \div \frac{1}{5} = 3 \times \underline{\quad} = \underline{\quad}$$



$$\frac{1}{4} \div 2 = \frac{1}{4} \times \underline{\quad} = \underline{\quad}$$

Write a related multiplication sentence to solve.

3. $2 \div \frac{1}{5}$

4. $\frac{1}{3} \div 3$

5. $\frac{1}{6} \div 2$

6. $5 \div \frac{1}{4}$

Fraction and Whole-Number Division

Write a related multiplication sentence to solve.

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

2. $\frac{1}{5} \div 3$

3. $2 \div \frac{1}{8}$

4. $\frac{1}{3} \div 4$

$3 \times 2 = 6$

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

6. $\frac{1}{2} \div 2$

7. $\frac{1}{4} \div 6$

8. $6 \div \frac{1}{5}$

9. $\frac{1}{5} \div 5$

10. $4 \div \frac{1}{8}$

11. $\frac{1}{3} \div 7$

12. $9 \div \frac{1}{2}$

Problem Solving

13. Isaac has a piece of rope that is 5 yards long. Into how many $\frac{1}{2}$ -yard pieces of rope can Isaac cut the rope?

14. Two friends share $\frac{1}{2}$ of a pineapple equally. What fraction of a whole pineapple does each friend get?

Lesson Objective: Represent division by drawing diagrams and writing story problems and equations.

Name _____

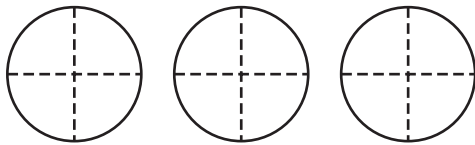
Interpret Division with Fractions

You can draw a diagram or write an equation to represent division with fractions.

Beatriz has 3 cups of applesauce. She divides the applesauce into $\frac{1}{4}$ -cup servings. How many servings of applesauce does she have?

One Way Draw a diagram to solve the problem.

Draw 3 circles to represent the 3 cups of applesauce. Since Beatriz divides the applesauce into $\frac{1}{4}$ -cup servings, draw lines to divide each “cup” into fourths.



To find $3 \div \frac{1}{4}$, count the total number of fourths in the 3 circles.

So, Beatriz has 12 one-fourth-cup servings of applesauce.

Another Way Write an equation to solve.

Write an equation.

$$3 \div \frac{1}{4} = n$$

Write a related multiplication equation.

$$3 \times 4 = n$$

Then solve.

$$\underline{12} = n$$

So, Beatriz has 12 one-fourth-cup servings of applesauce.

1. Draw a diagram to represent the problem. Then solve.

Drew has 5 granola bars. He cuts the bars into halves. How many $\frac{1}{2}$ -bar pieces does he have?

2. Write an equation to represent the problem. Then solve.

Three friends share $\frac{1}{4}$ pan of brownies. What fraction of the whole pan of brownies does each friend get?

Interpret Division with Fractions

Write an equation to represent the problem. Then solve.

1. Daniel has a piece of wire that is $\frac{1}{2}$ yard long. He cuts the wire into 3 equal pieces. What fraction of a yard is each piece?

$$\frac{1}{2} \div 3 = n; \frac{1}{2} \times \frac{1}{3} = n;$$

$$n = \frac{1}{6}; \frac{1}{6} \text{ yard}$$

2. Vita has a piece of ribbon that is 5 meters long. She cuts the ribbon into pieces that are each $\frac{1}{3}$ meter long. How many pieces does she cut?
-

Draw a diagram to represent the problem. Then solve.

3. Leah has 3 muffins. She cuts each muffin into fourths. How many $\frac{1}{4}$ -muffin pieces does she have?
-

4. Two friends share $\frac{1}{4}$ gallon of lemonade equally. What fraction of the gallon of lemonade does each friend get?
-

5. Write a story problem to represent $3 \div \frac{1}{2}$.
-
-

6. Write a story problem to represent $\frac{1}{4} \div 2$.
-
-

Problem Solving

7. Spencer has $\frac{1}{3}$ pound of nuts. He divides the nuts equally into 4 bags. What fraction of a pound of nuts is in each bag?
-

8. Humma has 3 apples. She slices each apple into eighths. How many $\frac{1}{8}$ -apple slices does she have?
-

Customary Length

You can convert one customary unit of length to another customary unit of length by multiplying or dividing.

Multiply to change from larger to smaller units of length.

Divide to change from smaller to larger units of length.

Convert 3 feet to inches.

Step 1

Decide:

Multiply or Divide

feet → inches
larger → smaller

Step 2

Think:

1 ft = 12 in., so
3 ft = (3 × 12) in.

Customary Units of Length

1 foot (ft) = 12 inches (in.)
1 yard (yd) = 3 feet
1 mile (mi) = 5,280 feet
1 mile = 1,760 yards

Step 3

Multiply.

$3 \times 12 = 36$

So, 3 feet = 36 inches.

Convert 363 feet to yards.

Step 1

Decide:

Multiply or Divide

feet → yards
smaller → larger

Step 2

Think:

3 ft = 1 yd,
so 363 ft = (363 ÷ 3) yd.

Step 3

Divide.

$363 \div 3 = \underline{121}$

So, 363 feet = 121 yards.

Convert.

1. 33 yd = _____ ft 2. 300 mi = _____ yd 3. 46 in. = ____ ft ____ in.

4. 96 yd = _____ ft 5. 48 ft = _____ yd 6. 2 mi 20 yd = _____ yd

Compare. Write <, >, or =.

7. 2 yd ○ 7 ft 8. 67 mi ○ 117,920 yd 9. 250 yd ○ 800 ft

10. 14 yd 2 ft ○ 16 ft 11. 34 ft 10 in. ○ 518 in. 12. 5 mi 8 ft ○ 8,800 yd

Customary Length

Convert.

1. 12 yd = **36** ft

2. 5 ft = _____ in.

3. 5 mi = _____ ft

total yards	feet in 1 yard	total feet
↓	↓	↓
12	× 3	= 36
12 yards = 36 feet		

4. 240 in. = _____ ft

5. 100 yd = _____ ft

6. 10 ft = _____ in.

7. 150 in. = _____ ft _____ in.

8. 7 yd 2 ft = _____ ft

9. 10 mi = _____ ft

Compare. Write $<$, $>$, or $=$.

10. 23 in. ○ 2 ft

11. 25 yd ○ 75 ft

12. 6,200 ft ○ 1 mi 900 ft

13. 100 in. ○ 3 yd 1 ft

14. 1,000 ft ○ 300 yd

15. 500 in. ○ 40 ft

Problem Solving 

16. Marita orders 12 yards of material to make banners. If she needs 1 foot of fabric for each banner, how many banners can she make?

17. Christy bought an 8-foot piece of lumber to trim a bookshelf. Altogether, she needs 100 inches of lumber for the trim. Did Christy buy enough lumber? Explain.

Customary Capacity

You can convert one unit of customary capacity to another by multiplying or dividing.

Multiply to change from larger to smaller units.

Divide to change from smaller to larger units.

Convert 8 cups to quarts.

Step 1

Decide:

Multiply or Divide

cups → quarts
smaller → larger

Step 2

Think:

4 c = 1 qt,
so 8 c = (8 ÷ 4) qt.

Step 3

Divide.

$$8 \div \underline{4} = \underline{2}$$

So, 8 cups = 2 quarts.

Convert 19 gallons to quarts.

Step 1

Decide:

Multiply or Divide

gallons → quarts
larger → smaller

Step 2

Think:

1 gal = 4 qt,
so 19 gal = (19 × 4) qt.

Step 3

Multiply.

$$19 \times \underline{4} = \underline{76}$$

So, 19 gallons = 76 quarts.

Customary Units of Capacity

1 cup (c) = 8 fluid ounces (fl oz)
1 pint (pt) = 2 cups
1 quart (qt) = 2 pints
1 quart = 4 cups
1 gallon (gal) = 4 quarts

Convert.

1. 14 pt = _____ qt 2. 32 qt = _____ c 3. 7 c = _____ fl oz

4. 28 c = _____ pt 5. 9 gal = _____ qt 6. 16 c = _____ qt

Compare. Write <, >, or =.

7. 16 qt ○ 60 c

8. 88 fl oz ○ 11 c

9. 3 gal ○ 10 qt

10. 36 qt ○ 54 c

11. 66 fl oz ○ 9 c

12. 16 gal ○ 64 qt

Customary Capacity

Convert.

1. 5 gal = 40 pt

2. 192 fl oz = _____ pt

3. 15 pt = _____ c

Think: 1 gallon = 4 quarts

1 quart = 2 pints

4. 240 fl oz = _____ c

5. 32 qt = _____ gal

6. 10 qt = _____ c

7. 48 c = _____ qt

8. 72 pt = _____ gal

9. 128 fl oz = _____ pt

Compare. Write $<$, $>$, or $=$.

10. 17 qt 4 gal

11. 96 fl oz 8 pt

12. 400 pt 100 gal

13. 100 fl oz 16 pt

14. 74 fl oz 8 c

15. 12 c 3 qt

Problem Solving 

16. Vickie made a recipe for 144 fluid ounces of scented candle wax. How many 1-cup candle molds can she fill with the recipe?

17. A recipe calls for 32 fluid ounces of heavy cream. How many 1-pint containers of heavy cream are needed to make the recipe?

Weight

You can convert one customary unit of weight to another by multiplying or dividing.

Multiply to change from larger to smaller units.

Divide to change from smaller to larger units.

Customary Units of Weight

1 pound (lb) = 16 ounces (oz)

1 ton (T) = 2,000 pounds

Convert 96 ounces to pounds.**Step 1**

Decide:

Multiply or Divide

ounces → pounds
smaller → larger

Step 2

Think:

16 oz = 1 lb
so 96 oz = (96 ÷ 16) lb.

Step 3

Divide.

96 ÷ 16 = 6

So, 96 ounces = 6 pounds.

Convert 4 pounds to ounces.**Step 1**

Decide:

Multiply or Divide

pounds → ounces
larger → smaller

Step 2

Think:

1 lb = 16 oz,
so 4 lb = (4 × 16) oz.

Step 3

Multiply.

4 × 16 = 64

So, 4 pounds = 64 ounces.

Convert.

1. 14 lb = _____ oz

2. 12,000 lb = _____ T

3. 2 T = _____ lb

4. 7 lb = _____ oz

5. 22 lb = _____ oz

6. 16 oz = _____ lb

Compare. Write <, >, or =.

7. 1 T ○ 3,000 lb

8. 3 lb ○ 43 oz

9. 5 T ○ 10,000 lb

10. 3 T ○ 6,000 lb

11. 6 lb ○ 96 oz

12. 16 T ○ 6,400 lb

Weight

Convert.

1. 96 oz = 6 lb

2. 6 T = _____ lb

3. 18 lb = _____ oz

total oz	oz in 1 lb	total lb
↓	↓	↓
96	÷ 16	= 6

4. 3,200 oz = _____ lb

5. 12 T = _____ lb

6. 9 lb = _____ oz

7. 7 lb = _____ oz

8. 100 lb = _____ oz

9. 60,000 lb = _____ T

Compare. Write $<$, $>$, or $=$.

10. 40 oz 4 lb

11. 80 oz 5 lb

12. 5,000 lb 5 T

13. 18,000 lb 9 T

14. 25 lb 350 oz

15. 27 oz 2 lb

Problem Solving 

16. Mr. Fields ordered 3 tons of gravel for a driveway at a factory. How many pounds of gravel did he order?

17. Sara can take no more than 22 pounds of luggage on a trip. Her suitcase weighs 112 ounces. How many more pounds can she pack without going over the limit?

Multistep Measurement Problems

An ice cream parlor donated 6 containers of ice cream to a local elementary school. Each container holds 3 gallons of ice cream. If each student is served 1 cup of ice cream, how many students can be served?

Step 1 Record the information you are given.

There are 6 containers of ice cream.

Each container holds 3 gallons of ice cream.

Step 2 Find the total amount of ice cream in the 6 containers.

6×3 gallons = 18 gallons of ice cream

Step 3 Convert from gallons to cups.

There are 4 quarts in 1 gallon, so 18 gallons = 72 quarts.

There are 2 pints in 1 quart, so 72 quarts = 144 pints.

There are 2 cups in 1 pint, so 144 pints = 288 cups.

So, 288 students can be served 1 cup of ice cream.

Solve.

- A cargo truck weighs 8,750 pounds. The weight limit for a certain bridge is 5 tons. How many pounds of cargo can be added to the truck before it exceeds the weight limit for the bridge?

- A plumber uses 16 inches of tubing to connect each washing machine in a laundry to the water source. He wants to install 18 washing machines. How many yards of tubing will he need?

- Larry has 9 gallons of paint. He uses 10 quarts to paint his kitchen and 3 gallons to paint his living room. How many pints of paint will be left?

- Ketisha is practicing for a marathon by running around a track that is 440 yards long. Yesterday she ran around the track 20 times. How many miles did she run?

Multistep Measurement Problems

Solve.

1. A cable company has 5 miles of cable to install. How many 100-yard lengths of cable can be cut?

Think: 1,760 yards = 1 mile.

So the cable company has $5 \times 1,760$, or 8,800 yards of cable.

Divide. $8,800 \div 100 = 88$

88 lengths

2. Afton made a chicken dish for dinner. She added a 10-ounce package of vegetables and a 14-ounce package of rice to 40 ounces of chicken. What was the total weight of the chicken dish in pounds?
3. A jar contains 26 fluid ounces of spaghetti sauce. How many cups of spaghetti sauce do 4 jars contain?
4. Coach Kent brings 3 quarts of sports drink to soccer practice. He gives the same amount of the drink to each of his 16 players. How many ounces of the drink does each player get?

-
5. Leslie needs 324 inches of fringe to put around the edge of a tablecloth. The fringe comes in lengths of 10 yards. If Leslie buys 1 package of fringe, how many feet of fringe will she have left over?

-
6. Darnell rented a moving truck. The weight of the empty truck was 7,860 pounds. When Darnell filled the truck with his items, it weighed 6 tons. What was the weight in pounds of the items that Darnell placed in the truck?
-

Problem Solving

7. A pitcher contains 40 fluid ounces of iced tea. Shelby pours 3 cups of iced tea. How many pints of iced tea are left in the pitcher?
8. Olivia ties 2.5 feet of ribbon onto one balloon. How many yards of ribbon does Olivia need for 18 balloons?

Name _____

Lesson Objective: Compare, contrast, and convert metric units.

Metric Measures

The metric system is based on place value. To convert between units, you multiply or divide by a power of 10. You **multiply** to change larger units to smaller units, such as liters to centiliters. You **divide** to change smaller units to larger units, such as meters to kilometers.

Convert 566 millimeters to decimeters.

- Think about how the two units are related.

1 decimeter = 100 millimeters

- **Think:** Should I multiply or divide?

Millimeters are smaller than decimeters.

So divide, or move the decimal point left for each multiple of 10.

$$\begin{array}{ccccccc} 566 & \div & 100 & = & \underline{5.66} & & \\ \text{millimeters} & & \text{mm in 1 dm} & & \text{total decimeters} & & \end{array}$$

So, 566 mm = 5.66 dm.

Metric Units of Length

1 centimeter (cm) = 10 millimeters (mm)

1 decimeter (dm) = 10 centimeters (cm)

1 meter (m) = 1,000 millimeters (mm)

1 kilometer (km) = 1,000 meters (m)

				5	6	6
kilo- (k)	hecto- (h)	deka- (da)	meter liter gram	deci- (d)	centi- (c)	milli- (m)

Note: In the original image, a decimal point is placed between the 5 and 6 in the top row, and two curved arrows point from the 6 and 6 to the left, indicating the movement of the decimal point.

Complete the equation to show the conversion.

1. 115 km 10 = _____ hm 2. 418 cL 10 = _____ dL

115 km 100 = _____ dam 418 cL 100 = _____ L

115 km 1,000 = _____ m 418 cL 1,000 = _____ daL

Convert.

3. 40 cm = _____ mm 4. 500 mL = _____ dL 5. 6 kg = _____ g

6. 5,000 cL = _____ L 7. 4 kg = _____ hg 8. 200 mm = _____ cm

Metric Measures

Convert.

1. $16 \text{ m} = \mathbf{16,000} \text{ mm}$

number of meters		millimeters in 1 meter		number of millimeters
↓		↓		↓
16	×	1,000	=	16,000

$16 \text{ m} = 16,000 \text{ mm}$

2. $6,500 \text{ cL} = \underline{\hspace{2cm}} \text{ L}$

3. $15 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

4. $3,200 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$

5. $12 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

6. $200 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

7. $70,000 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$

8. $100 \text{ dL} = \underline{\hspace{2cm}} \text{ L}$

9. $60 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$

Compare. Write $<$, $>$, or $=$.

10. $900 \text{ cm} \bigcirc 9,000 \text{ mm}$

11. $600 \text{ km} \bigcirc 5 \text{ m}$

12. $5,000 \text{ cm} \bigcirc 5 \text{ m}$

13. $18,000 \text{ g} \bigcirc 10 \text{ kg}$

14. $8,456 \text{ mL} \bigcirc 9 \text{ L}$

15. $2 \text{ m} \bigcirc 275 \text{ cm}$

Problem Solving 

16. Bria ordered 145 centimeters of fabric. Jayleen ordered 1.5 meters of fabric. Who ordered more fabric?

17. Ed fills his sports bottle with 1.2 liters of water. After his bike ride, he drinks 200 milliliters of the water. How much water is left in Ed's sports bottle?

Lesson Objective: Solve problems about customary and metric conversions using the strategy *make a table*.

Name _____

Problem Solving • Customary and Metric Conversions

You can use the strategy *make a table* to help you solve problems about customary and metric conversions.

Jon's faucet is dripping at the rate of 24 centiliters in a day. How many milliliters of water will have dripped from Jon's faucet in 24 hours?

Read the Problem

What do I need to find?

I need to find how many milliliters of water will have dripped from Jon's faucet in 24 hours.

What information do I need to use?

I need to use the number of cL that have dripped in 24 hr and the number of mL in a cL.

How will I use the information?

I will make a table to show the relationship between the number of centiliters and the number of milliliters.

Conversion Table

	L	dL	cL	mL
1 L	1	10	100	1,000
1 dL	$\frac{1}{10}$	1	10	100
1 cL	$\frac{1}{100}$	$\frac{1}{10}$	1	10
1 mL	$\frac{1}{1,000}$	$\frac{1}{100}$	$\frac{1}{10}$	1

I can use the Conversion Table to find the number of milliliters in 1 centiliter.

There are 10 milliliters in 1 centiliter.

cL	1	2	4	24
mL	10	20	40	240

So, 240 milliliters of water will have dripped from Jon's faucet in 24 hours.

Make a table to help you solve the problems.

1. Fernando has a bucket that holds 3 gallons of water. He is filling the bucket using a 1-pint container. How many times will he have to fill the pint container in order to fill the bucket?
2. Lexi has a roll of shelf paper that is 800 cm long. She wants to cut the paper into 1-m strips to line the shelves in her pantry. How many 1-meter strips can she cut?

Problem Solving • Customary and Metric Conversions

Solve each problem by making a table.

1. Thomas is making soup. His soup pot holds 8 quarts of soup. How many 1-cup servings of soup will Thomas make?

32 1-cup servings

Number of Quarts	1	2	3	4	8
Number of Cups	4	8	12	16	32

2. Paulina works out with a 2.5-kilogram mass. What is the mass of the 2.5-kilogram mass in grams?

3. Alex lives 500 yards from the park. How many inches does Alex live from the park?

4. Emma uses a 250-meter roll of crepe paper to make streamers. How many dekameters of crepe paper does Emma use?

5. A flatbed truck is loaded with 7,000 pounds of bricks. How many tons of brick are on the truck?

Name _____

Elapsed Time

You can solve elapsed time problems by converting units of time.

Starting at 4:20 P.M., Connie practiced piano for 90 minutes. At what time did Connie stop practicing piano?

Convert 90 minutes to hours and minutes. Then find the end time.

Step 1 To convert minutes to hours, divide.

$$90 \div 60 = 1 \text{ with a remainder of } 30$$

$$90 \text{ min} = \underline{1} \text{ hr } \underline{30} \text{ min}$$

Step 2 Count forward by hours until you reach 1 hour.

$$4:20 \rightarrow 5:20 = 1 \text{ hour}$$

Step 3 Count forward by minutes until you reach 30 minutes.

$$5:20 \rightarrow 5:30 = 1 \text{ hour } 10 \text{ minutes}$$

$$5:30 \rightarrow 5:40 = 1 \text{ hour } 20 \text{ minutes}$$

$$5:40 \rightarrow 5:50 = 1 \text{ hour } 30 \text{ minutes}$$

Connie stops practicing piano at 5:50 P.M.

Units of Time
60 seconds (s) = 1 minute (min)
60 minutes = 1 hour (hr)
24 hours = 1 day (d)
7 days = 1 week (wk)
52 weeks = 1 year (yr)
12 months (mo) = 1 year
365 days = 1 year

Convert.

1. 480 min = _____ hr 2. 4 d = _____ hr 3. 125 hr = _____ d _____ hr

Find the start, elapsed, or end time.

4. Start time: 7:15 A.M.

Elapsed time: 2 hr 20 min

End time: _____

5. Start time: 6:28 A.M.

Elapsed time: _____

End time: 10:08 A.M.

6. Start time: _____

Elapsed time: 5 hr 50 min

End time: 7:55 P.M.

7. Start time: 5:24 P.M.

Elapsed time: 6 hr

End time: _____

Elapsed Time

Convert.

1. 5 days = **120** hr 2. 8 hr = _____ min 3. 30 min = _____ s

Think: 1 day = 24 hours
 $5 \times 24 = 120$

4. 15 hr = _____ min 5. 5 yr = _____ d 6. 7 d = _____ hr
7. 24 hr = _____ min 8. 600 s = _____ min 9. 60,000 min = _____ hr

Find the start, elapsed, or end time.

10. Start time: 11:00 A.M.
 Elapsed time: 4 hours 5 minutes
 End time: _____
11. Start time: 6:30 P.M.
 Elapsed time: 2 hours 18 minutes
 End time: _____
12. Start time: _____
 Elapsed time: $9\frac{3}{4}$ hours
 End time: 6:00 P.M.
13. Start time: 2:00 P.M.
 Elapsed time: _____
 End time: 8:30 P.M.

Problem Solving 

14. Kiera's dance class starts at 4:30 P.M. and ends at 6:15 P.M. How long is her dance class?

15. Julio watched a movie that started at 11:30 A.M. and ended at 2:12 P.M. How long was the movie?

Name _____

Line Plots

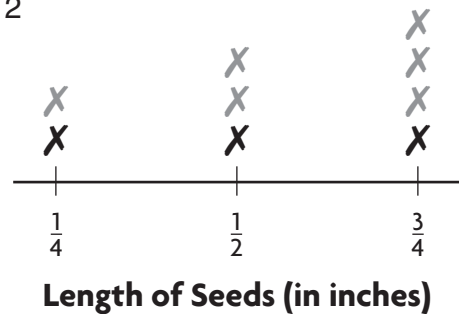
A **line plot** is a graph that shows the shape of a data set by placing Xs above each data value on a number line. You can make a line plot to represent a data set and then use the line plot to answer questions about the data set.

Students measure the lengths of several seeds.
The length of each seed is listed below.

$\frac{1}{2}$ inch, $\frac{3}{4}$ inch, $\frac{1}{2}$ inch, $\frac{1}{4}$ inch, $\frac{3}{4}$ inch, $\frac{3}{4}$ inch, $\frac{3}{4}$ inch, $\frac{1}{4}$ inch, $\frac{1}{2}$ inch

What is the combined length of the seeds that are $\frac{1}{4}$ inch long?

Step 1 To represent the different lengths of the seeds, draw and label a line plot with the data values $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$. Then use an X to represent each seed. The line plot has been started for you.



Step 2 There are 2 Xs above $\frac{1}{4}$ on the line plot.

Multiply to find the combined length of the seeds:

$$\underline{2} \times \underline{\frac{1}{4}} = \underline{\frac{2}{4}}, \text{ or } \underline{\frac{1}{2}} \text{ inch}$$

The combined length of the seeds that are $\frac{1}{4}$ inch long is $\frac{1}{2}$ inch.

You can use the same process to find the combined lengths of the seeds that are $\frac{1}{2}$ inch long and $\frac{3}{4}$ inch long.

Use the data and the line plot above to answer the questions.

1. What is the total length of all the seeds that the students measured?
2. What is the average length of one of the seeds that the students measured?

Line Plots

Use the data to complete the line plot. Then answer the questions.

A clerk in a health food store makes bags of trail mix. The amount of trail mix in each bag is listed below.

$$\frac{1}{4} \text{ lb}, \frac{1}{4} \text{ lb}, \frac{3}{4} \text{ lb}, \frac{1}{2} \text{ lb}, \frac{1}{4} \text{ lb}, \frac{3}{4} \text{ lb},$$

$$\frac{3}{4} \text{ lb}, \frac{3}{4} \text{ lb}, \frac{1}{2} \text{ lb}, \frac{1}{4} \text{ lb}, \frac{1}{2} \text{ lb}, \frac{1}{2} \text{ lb}$$

1. What is the combined weight of the $\frac{1}{4}$ -lb bags? 1 lb

Think: There are four $\frac{1}{4}$ -pound bags.

2. What is the combined weight of the $\frac{1}{2}$ -lb bags? _____

3. What is the combined weight of the $\frac{3}{4}$ -lb bags? _____

4. What is the total weight of the trail mix used in all the bags? _____

5. What is the average amount of trail mix in each bag? _____



Julie uses crystals to make a bracelet. The lengths of the crystals are shown below.

$$\frac{1}{2} \text{ in.}, \frac{5}{8} \text{ in.}, \frac{3}{4} \text{ in.}, \frac{1}{2} \text{ in.}, \frac{3}{8} \text{ in.}, \frac{1}{2} \text{ in.}, \frac{3}{4} \text{ in.},$$

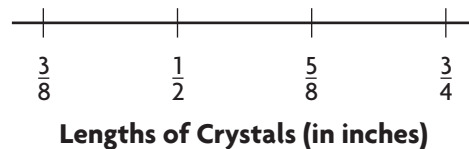
$$\frac{3}{8} \text{ in.}, \frac{3}{4} \text{ in.}, \frac{5}{8} \text{ in.}, \frac{1}{2} \text{ in.}, \frac{3}{8} \text{ in.}, \frac{5}{8} \text{ in.}, \frac{3}{4} \text{ in.}$$

6. What is the combined length of the $\frac{1}{2}$ -in. crystals? _____

7. What is the combined length of the $\frac{5}{8}$ -in. crystals? _____

8. What is the total length of all the crystals in the bracelet? _____

9. What is the average length of each crystal in the bracelet? _____



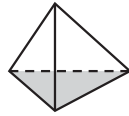
Name _____

Three-Dimensional Figures

A **polyhedron** is a solid figure with faces that are polygons. You can identify a polyhedron by the shape of its faces.

A **pyramid** is a polyhedron with one polygon base. The lateral faces of a pyramid are triangles that meet at a common vertex.

triangular pyramid The base and faces are triangles.



rectangular pyramid The base is a rectangle.



square pyramid The base is a square.



pentagonal pyramid The base is a pentagon.

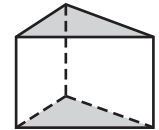


hexagonal pyramid The base is a hexagon.



A **prism** is a polyhedron with two congruent polygons as bases. The lateral faces of a prism are rectangles.

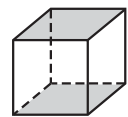
triangular prism The two bases are triangles.



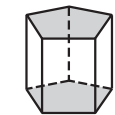
rectangular prism All faces are rectangles.



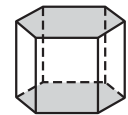
square prism or cube All faces are squares.



pentagonal prism The two bases are pentagons.



hexagonal prism The two bases are hexagons.



A solid figure with curved surfaces is **not a polyhedron**.

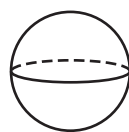
cone The one base is a circle.



cylinder The two bases are circles.



sphere There is no base.

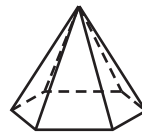


Classify the solid figure. Write *prism*, *pyramid*, *cone*, *cylinder*, or *sphere*.

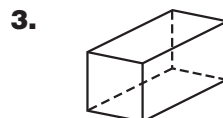
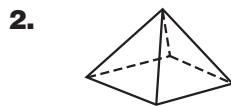
The solid figure has one base.

The rest of its faces are triangles.

So, the solid figure is a pyramid.

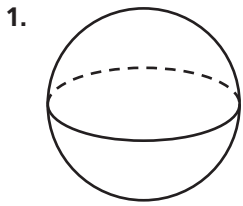


Classify each solid figure. Write *prism*, *pyramid*, *cone*, *cylinder*, or *sphere*.

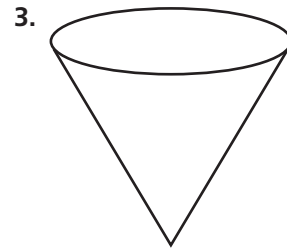
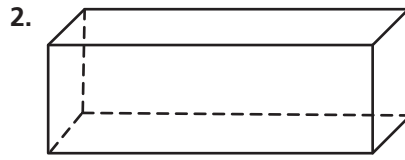


Three-Dimensional Figures

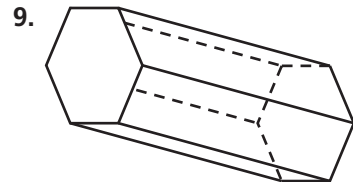
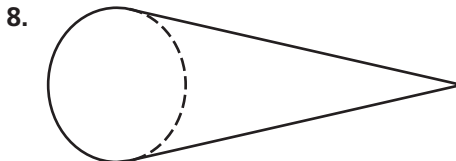
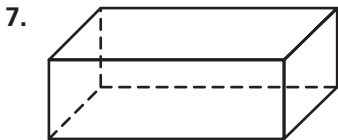
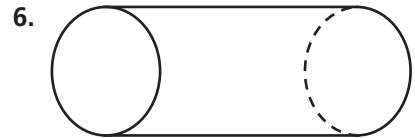
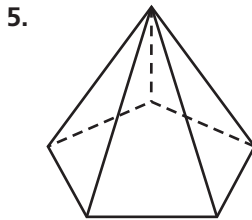
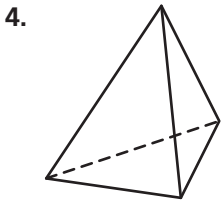
Classify the solid figure. Write *prism*, *pyramid*, *cone*, *cylinder*, or *sphere*.



There are no bases. There is 1 curved surface. It is a **sphere**.



Name the solid figure.



Problem Solving



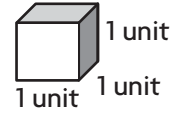
10. Darrien is making a solid figure out of folded paper. His solid figure has six congruent faces that are all squares. What solid figure did Darrien make?

11. Nanako said she drew a square pyramid and that all of the faces are triangles. Is this possible? **Explain.**

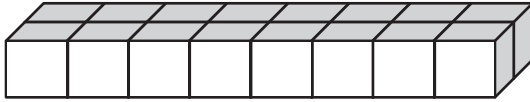
Name _____

Unit Cubes and Solid Figures

A **unit cube** is a cube that has a length, width, and height of 1 unit. You can use unit cubes to build a rectangular prism.



Count the number of cubes used to build the rectangular prism.



The length of the prism is made up of 8 unit cubes.

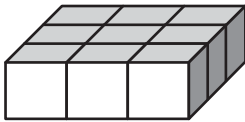
The width of the prism is made up of 2 unit cubes.

The height of the prism is made up of 1 unit cube.

The number of unit cubes used to build the rectangular prism is 16.

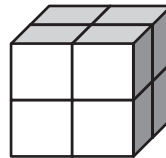
Count the number of unit cubes used to build each solid figure.

1.



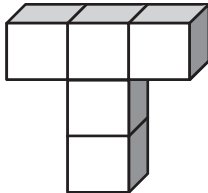
_____ unit cubes

2.



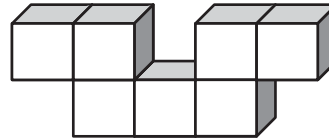
_____ unit cubes

3.



_____ unit cubes

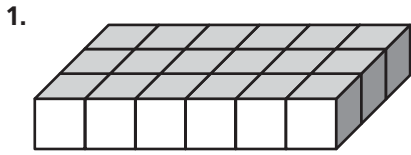
4.



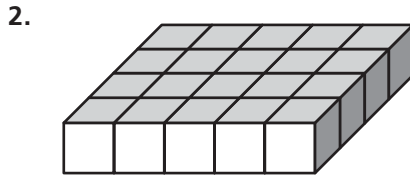
_____ unit cubes

Unit Cubes and Solid Figures

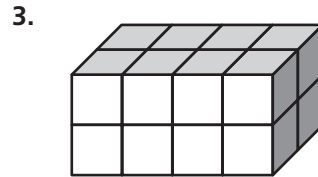
Count the number of cubes used to build each solid figure.



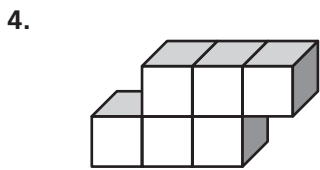
18 unit cubes



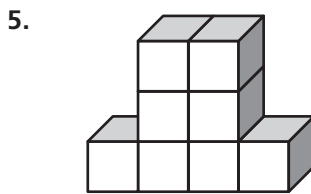
_____ unit cubes



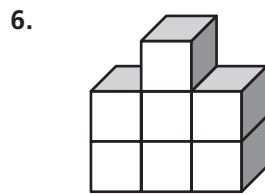
_____ unit cubes



_____ unit cubes

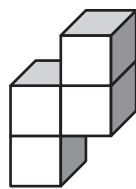
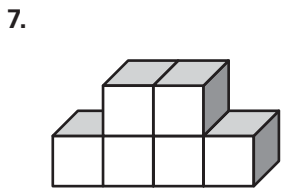


_____ unit cubes

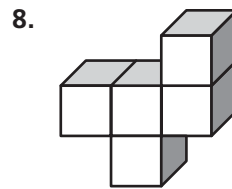


_____ unit cubes

Compare the number of unit cubes in each solid figure. Use $<$, $>$, or $=$.



_____ unit cubes ○ _____ unit cubes



_____ unit cubes ○ _____ unit cubes

Problem Solving

9. A carton can hold 1,000 unit cubes that measure 1 inch by 1 inch by 1 inch. Describe the dimensions of the carton using unit cubes.

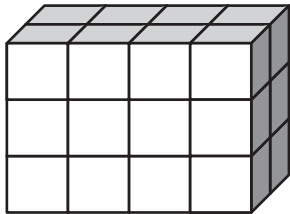
10. Peter uses unit cubes to build a figure in the shape of the letter X. What is the fewest unit cubes that Peter can use to build the figure?

Name _____

Understand Volume

The **volume** of a rectangular prism is equal to the number of unit cubes that make up the prism. Each unit cube has a volume of 1 cubic unit.

Find the volume of the prism. 1 unit cube = 1 cubic inch



Step 1 Count the number of unit cubes in the bottom layer of the prism.

There are 4 unit cubes that make up the length of the first layer.

There are 2 unit cubes that make up the width of the first layer.

There is 1 unit cube that makes up the height of the first layer.

So, altogether, there are 8 unit cubes that make up the bottom layer of the prism.

Step 2 Count the number of layers of cubes that make up the prism.

The prism is made up of 3 layers of unit cubes.

Step 3 Find the total number of cubes that fill the prism.

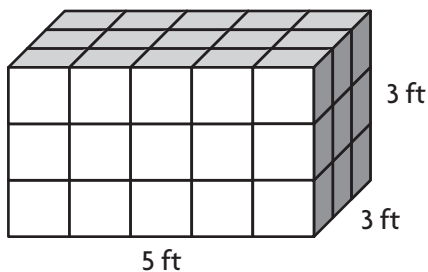
Multiply the number of layers by the number of cubes in each layer.

$$3 \times 8 = \underline{24} \text{ unit cubes}$$

Each unit cube has a volume of 1 cubic inch. So, the volume of the prism is 24×1 , or 24 cubic inches.

Use the unit given. Find the volume.

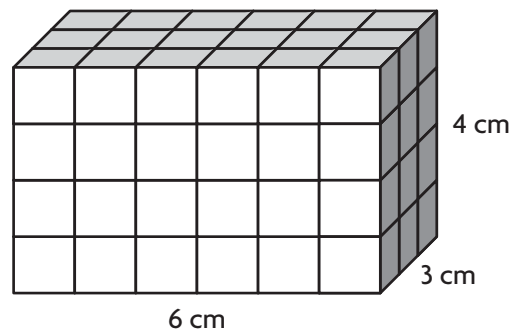
1.



Each cube = 1 cu ft

Volume = _____ cu _____

2.

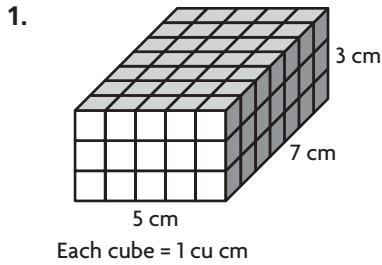


Each cube = 1 cu cm

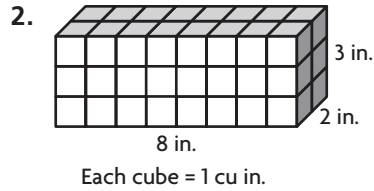
Volume = _____ cu _____

Understand Volume

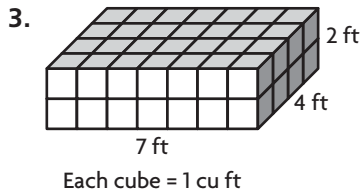
Use the unit given. Find the volume.



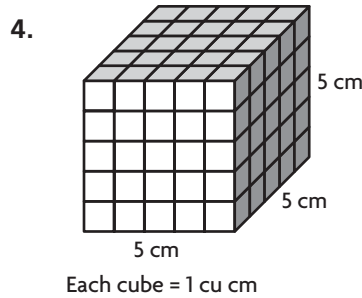
Volume = 105 cu cm



Volume = _____ cu _____

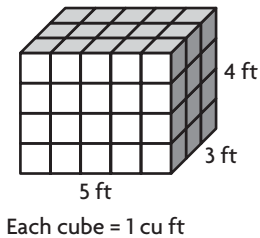


Volume = _____ cu _____

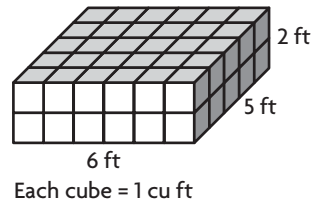


Volume = _____ cu _____

5. Compare the volumes. Write $<$, $>$, or $=$.



_____ cu ft _____ cu ft



Problem Solving REAL WORLD

6. A manufacturer ships its product in boxes with edges of 4 inches. If 12 boxes are put in a carton and completely fill the carton, what is the volume of the carton?

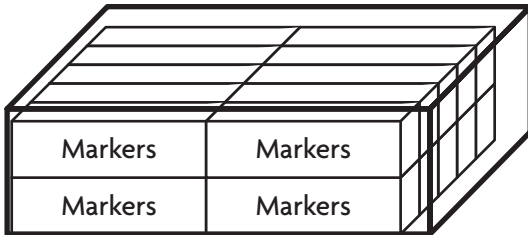
7. Matt and Mindy each built a rectangular prism that has a length of 5 units, a width of 2 units, and a height of 4 units. Matt used cubes that are 1 cm on each side. Mindy used cubes that are 1 in. on each side. What is the volume of each prism?

Name _____

Estimate Volume

You can estimate the volume of a larger box by filling it with smaller boxes.

Mario packs boxes of markers into a large box. The volume of each box of markers is 15 cubic inches. Estimate the volume of the large box.



The volume of one box of markers is 15 cubic inches.

Use the box of markers to estimate the volume of the large box.

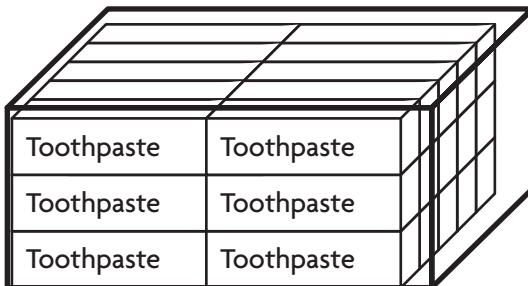
- The large box holds 2 layers of boxes of markers, a top layer and a bottom layer. Each layer contains 10 boxes of markers. So, the large box holds about 2×10 , or 20 boxes of markers.
- Multiply the volume of 1 box of markers by the estimated number of boxes of markers that fit in the large box.

$$\underline{20} \times \underline{15} = \underline{300}$$

So, the volume of the large box is about 300 cubic inches.

Estimate the volume.

1. Each box of toothpaste has a volume of 25 cubic inches.

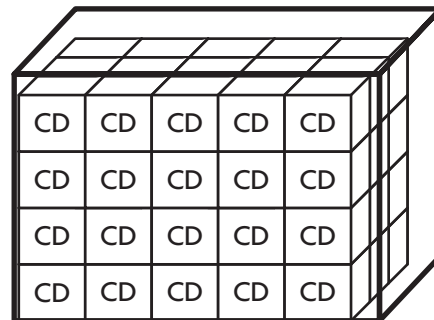


There are _____ boxes of toothpaste in the large box.

The volume of the large box is

$$\underline{\quad} \times 25 = \underline{\quad} \text{ cubic inches.}$$

2. Volume of CD case: 80 cu cm

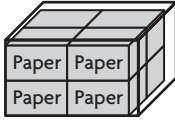


Volume of large box: _____

Estimate Volume

Estimate the volume.

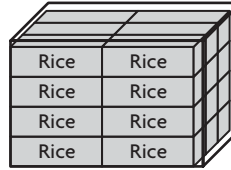
1. Volume of package of paper: 200 cu in.



Think: Each package of paper has a volume of 200 cu in. There are 8 packages of paper in the larger box. So, the volume of the large box is about 8 × 200, or 1,600 cubic inches.

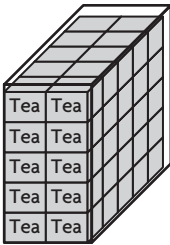
Volume of large box: 1,600 cu in.

2. Volume of rice box: 500 cu cm



Volume of large box: _____

3. Volume of tea box: 40 cu in.



Volume of large box: _____

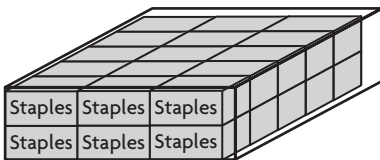
4. Volume of DVD case: 20 cu in.



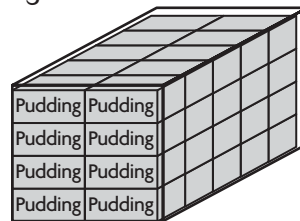
Volume of large box: _____

Problem Solving 

5. Theo fills a large box with boxes of staples. The volume of each box of staples is 120 cu cm. Estimate the volume of the large box.

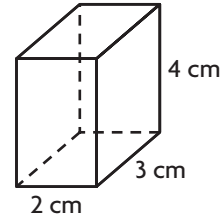


6. Lisa uses pudding boxes to estimate the volume of the box below. The volume of each pudding box is 150 cu in. Estimate the volume of the large box.



Volume of Rectangular Prisms

Jorge wants to find the volume of this rectangular prism. He can use cubes that measure 1 centimeter on each side to find the volume.

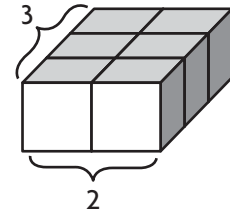


Step 1 The base layer has a length of 2 centimeters and a width of 3 centimeters. Multiply to find the area of the base.

$$\text{Base} = 2 \times 3$$

$$\text{Base} = 6 \text{ cm}^2$$

Step 2 The height of the prism is 4 centimeters. Add the number of cubes in each layer to find the volume.



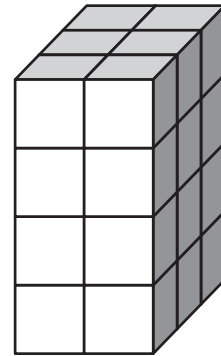
Remember: Each layer has 6 cubes.

Step 3 Count the cubes. 24 cubes. Multiply the base and the height to check your answer.

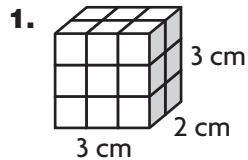
$$\text{Volume} = 6 \times 4$$

$$\text{Volume} = 24 \text{ cubic centimeters}$$

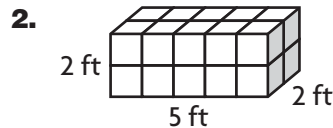
So, the volume of Jorge's rectangular prism is 24 cubic centimeters.



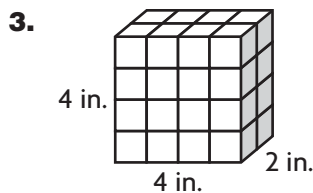
Find the volume.



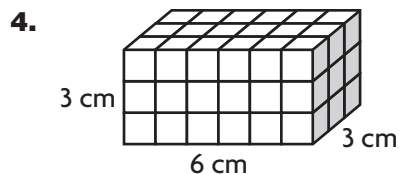
Volume: _____



Volume: _____



Volume: _____

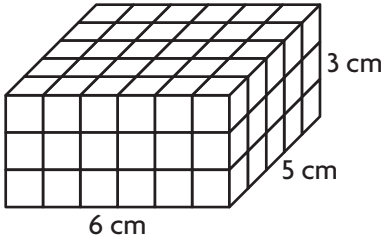


Volume: _____

Volume of Rectangular Prisms

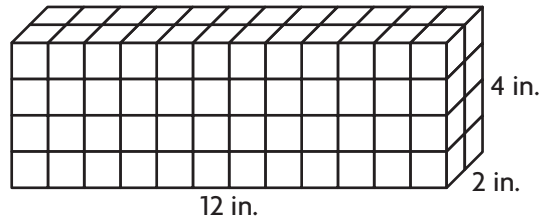
Find the volume.

1.



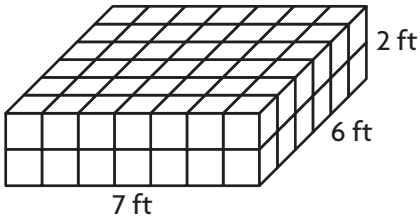
Volume: **90 cm³**

2.



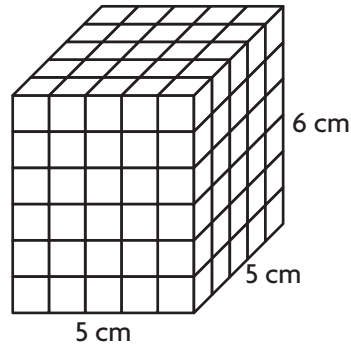
Volume: _____

3.



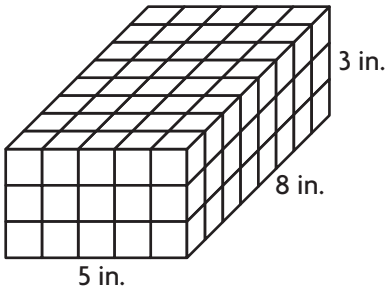
Volume: _____

4.



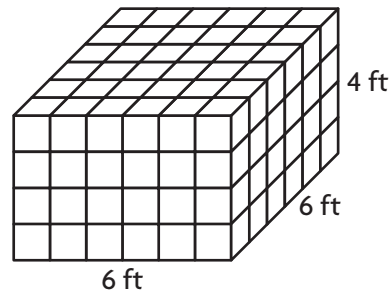
Volume: _____

5.



Volume: _____

6.



Volume: _____

Problem Solving REAL WORLD

7. Aaron keeps his baseball cards in a cardboard box that is 12 inches long, 8 inches wide, and 3 inches high. What is the volume of this box?

8. Amanda's jewelry box is in the shape of a cube that has 6-inch edges. What is the volume of Amanda's jewelry box?

Name _____

Algebra • Apply Volume Formulas

You can use a formula to find the volume of a rectangular prism.

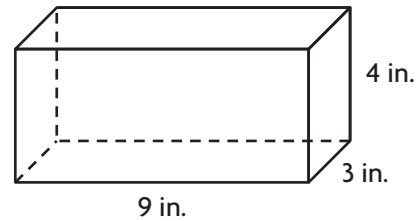
$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

$$V = (l \times w) \times h$$

Find the volume of the rectangular prism.

Step 1 Identify the length, width, and height of the rectangular prism.

length = 9 in. width = 3 in. height = 4 in.



Step 2 Substitute the values of the length, width, and height into the formula.

$$V = (l \times w) \times h$$

$$V = (\underline{9} \times \underline{3}) \times \underline{4}$$

Step 3 Multiply the length by the width.

$$V = (9 \times 3) \times 4$$

$$V = \underline{27} \times 4$$

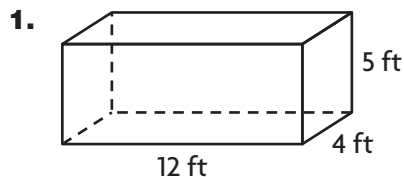
Step 4 Multiply the product of the length and width by the height.

$$V = 27 \times \underline{4}$$

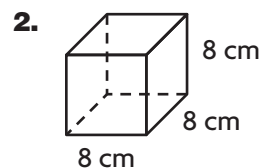
$$= \underline{108}$$

So, the volume of the rectangular prism is 108 cubic inches.

Find the volume.



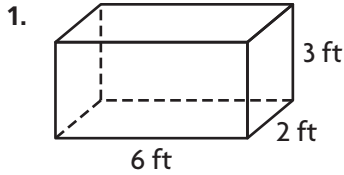
$V =$ _____



$V =$ _____

Apply Volume Formulas

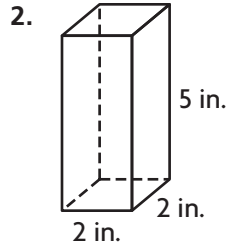
Find the volume.



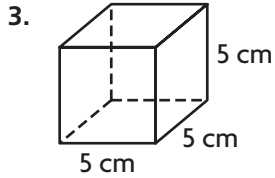
$$V = \underline{l} \times \underline{w} \times \underline{h}$$

$$V = \underline{6} \times \underline{2} \times \underline{3}$$

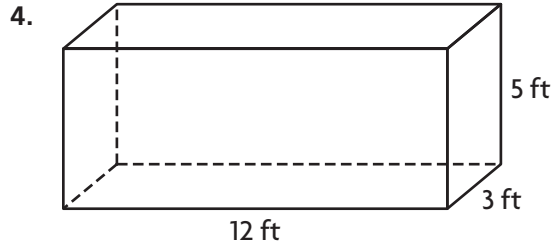
$$V = \underline{36 \text{ ft}^3}$$



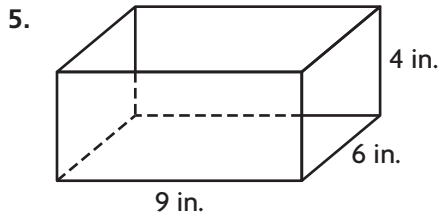
$$V = \underline{\hspace{2cm}}$$



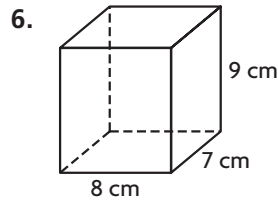
$$V = \underline{\hspace{2cm}}$$



$$V = \underline{\hspace{2cm}}$$



$$V = \underline{\hspace{2cm}}$$



$$V = \underline{\hspace{2cm}}$$

Problem Solving 

7. A construction company is digging a hole for a swimming pool. The hole will be 12 yards long, 7 yards wide, and 3 yards deep. How many cubic yards of dirt will the company need to remove?

8. Amy rents a storage room that is 15 feet long, 5 feet wide, and 8 feet. What is the volume of the storage room?

Name _____

Problem Solving • Compare Volumes

A company makes aquariums that come in three sizes of rectangular prisms. The length of each aquarium is three times its width and depth. The depths of the aquariums are 1 foot, 2 feet, and 3 feet. What is the volume of each aquarium?

Read the Problem	Solve the Problem																
<p>What do I need to find?</p> <p>I need to find the <u>volume</u> of each aquarium.</p>	<p>Think: The depth of an aquarium is the same as the height of the prism formed by the aquarium</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Length (ft)</th> <th style="padding: 5px;">Width (ft)</th> <th style="padding: 5px;">Depth, or Height (ft)</th> <th style="padding: 5px;">Volume (cu ft)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">6</td> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">81</td> </tr> </tbody> </table> <p>So, the volumes of the aquariums are 3 cubic feet, 24 cubic feet, and 81 cubic feet.</p>	Length (ft)	Width (ft)	Depth, or Height (ft)	Volume (cu ft)	3	1	1	3	6	2	2	24	9	3	3	81
Length (ft)		Width (ft)	Depth, or Height (ft)	Volume (cu ft)													
3		1	1	3													
6	2	2	24														
9	3	3	81														
<p>What information do I need to use?</p> <p>I can use the formula for volume, $V = l \times w \times h$, or $V = B \times h$. I can use <u>1 ft, 2 ft, and 3 ft</u> as the depths. I can use the clues <u>the length is three times the width and depth</u>.</p>																	
<p>How will I use the information?</p> <p>I will use the <u>volume formula</u> and a <u>table</u> to list all of the possible combinations of lengths, widths, and depths.</p>																	

1. Jamie needs a bin for her school supplies. A blue bin has a length of 12 inches, a width of 5 inches, and a height of 4 inches. A green bin has a length of 10 inches, a width of 6 inches, and a height of 5 inches. What is the volume of the bin with the greatest volume?

2. Suppose the blue bin that Jamie found had a length of 5 inches, a width of 5 inches, and a height of 12 inches. Would one bin have a greater volume than the other? **Explain.**

Problem Solving • Compare Volumes

Make a table to help you solve each problem.

1. Amita wants to make a mold for a candle. She wants the shape of the candle to be a rectangular prism with a volume of exactly 28 cubic centimeters. She wants the sides to be in whole centimeters. How many different molds can she make?

10 molds

2. Amita decides that she wants the molds to have a square base. How many of the possible molds can she use?

3. Raymond wants to make a box that has a volume of 360 cubic inches. He wants the height to be 10 inches and the other two dimensions to be whole numbers of inches. How many different-sized boxes can he make?

4. Jeff put a small box that is 12 inches long, 8 inches wide, and 4 inches tall inside a box that is 20 inches long, 15 inches wide, and 9 inches high. How much space is left in the larger box?

5. Mrs. Nelson has a rectangular flower box that is 5 feet long and 2 feet tall. She wants the width of the box to be no more than 5 feet. If the width is a whole number, what are the possible volumes for the flower box?

6. Sophina bought 3 yards of trim to put around a rectangular scarf. She wants the width of the scarf to be a whole number that is at least 6 inches and at most 12 inches. If she uses all the trim, what are the possible dimensions of her scarf? Write your answers in inches.

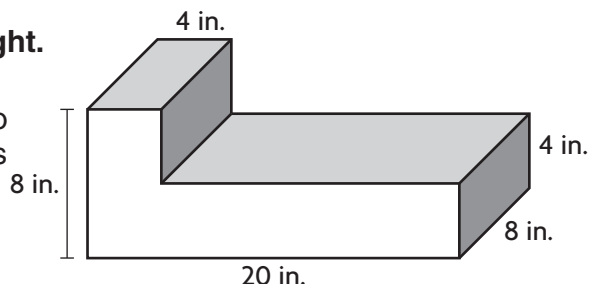
Name _____

Find Volume of Composed Figures

A composite figure is a solid made up of two or more solids. To find the volume of a composite figure, first find the volume of each solid that makes up the figure. Then find the sum of the volumes of the figures.

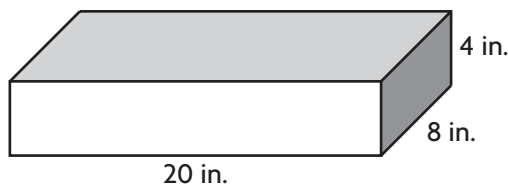
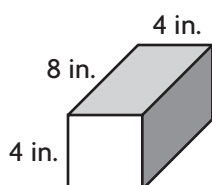
Find the volume of the composite figure at right.

Step 1 Break apart the composite figure into two rectangular prisms. Label the dimensions of each prism.



Prism 1

Prism 2



Step 2 Find the volume of each prism.

Prism 1

$$V = (l \times w) \times h$$

$$V = \underline{4} \times \underline{8} \times \underline{4}$$

$$V = 128 \text{ in.}^3$$

Prism 2

$$V = (l \times w) \times h$$

$$V = \underline{20} \times \underline{8} \times \underline{4}$$

$$V = 640 \text{ in.}^3$$

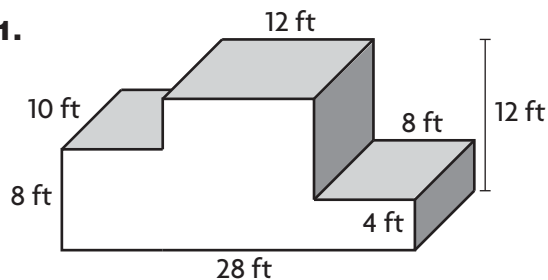
Step 3 Find the sum of the volumes of the two prisms.

$$\begin{array}{rcl} \text{Volume of Prism 1} + \text{Volume of Prism 2} & = & \text{Volume of Composite Figure} \\ \underline{128} + \underline{640} & = & \text{Volume of Composite Figure} \\ \underline{768} & = & \text{Volume of Composite Figure} \end{array}$$

So, the volume of the composite figure is 768 in.³

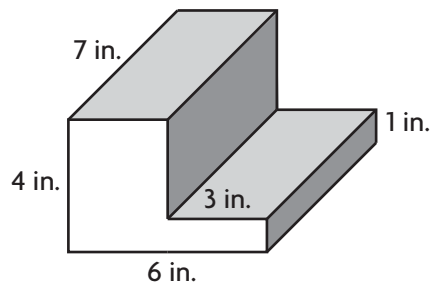
Find the volume of the composite figure.

1.



$V = \underline{\hspace{2cm}}$

2.

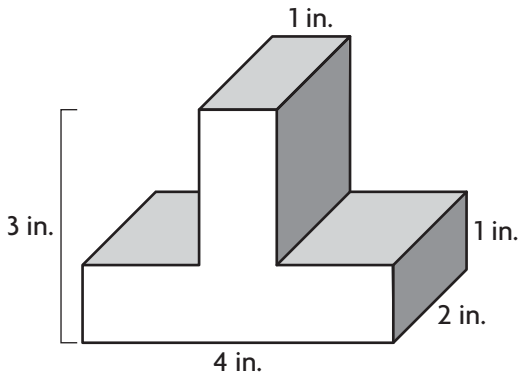


$V = \underline{\hspace{2cm}}$

Find Volume of Composed Figures

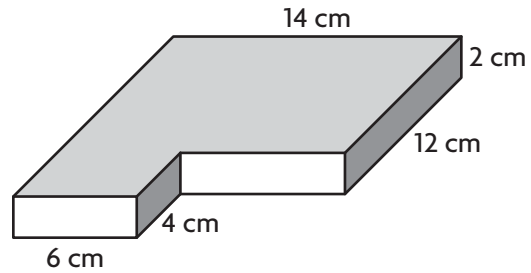
Find the volume of the composite figure.

1.



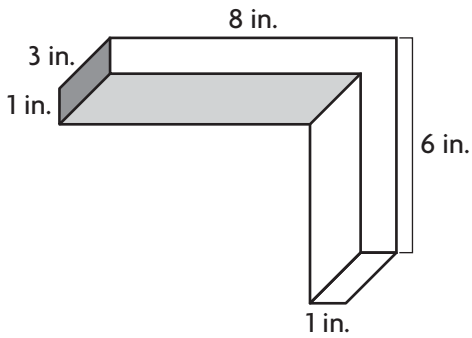
$V =$ _____

2.



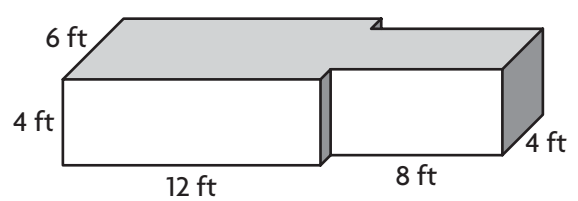
$V =$ _____

3.



$V =$ _____

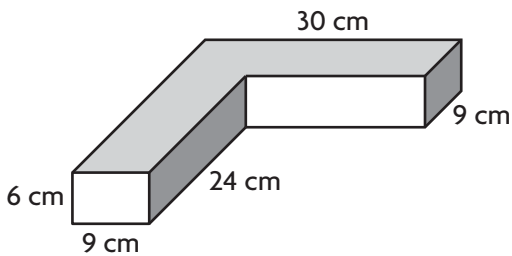
4.



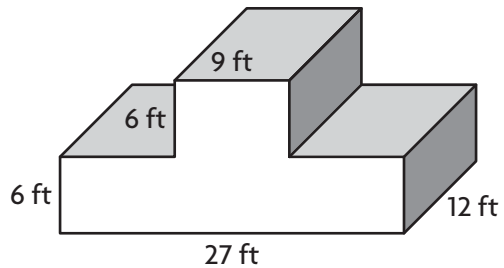
$V =$ _____

Problem Solving REAL WORLD

5. As part of her shop class, Jules made the figure below out of pieces of wood. How much space does the figure she made take up?



6. What is the volume of the composite figure below?



Ordered Pairs

A coordinate grid is like a sheet of graph paper bordered at the left and at the bottom by two perpendicular number lines. The **x-axis** is the horizontal number line at the bottom of the grid. The **y-axis** is the vertical number line on the left side of the grid.

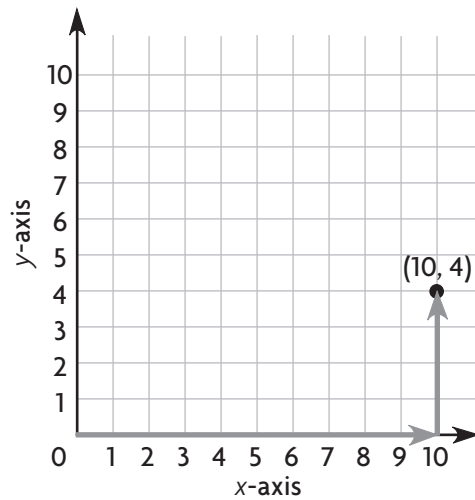
An ordered pair is a pair of numbers that describes the location of a point on the grid. An ordered pair contains two coordinates, x and y . The **x-coordinate** is the first number in the ordered pair, and the **y-coordinate** is the second number.

$(x, y) \longrightarrow (10, 4)$

Plot and label $(10, 4)$ on the coordinate grid.

To graph an ordered pair:

- Start at the origin, $(0, 0)$.
- Think: The letter x comes before y in the alphabet. Move across the x -axis first.
- The x -coordinate is 10, so move 10 units right.
- The y -coordinate is 4, so move 4 units up.
- Plot and label the ordered pair $(10, 4)$.

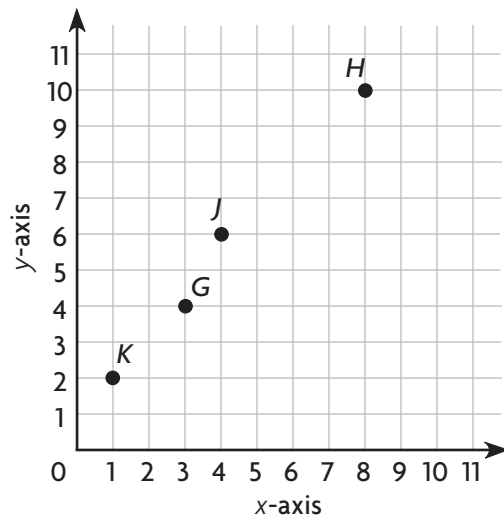


Use the coordinate grid to write an ordered pair for the given point.

1. G _____ 2. H _____
 3. J _____ 4. K _____

Plot and label the points on the coordinate grid.

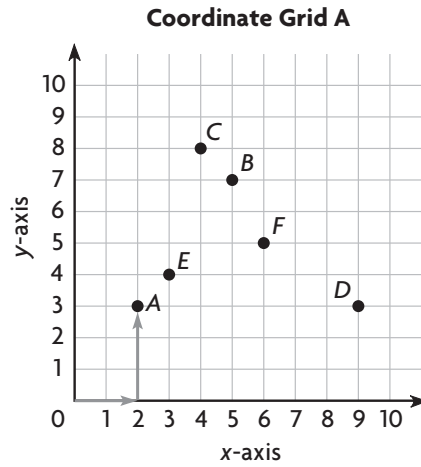
5. $A(1, 6)$ 6. $B(1, 9)$
 7. $C(3, 7)$ 8. $D(5, 5)$
 9. $E(9, 3)$ 10. $F(6, 2)$



Ordered Pairs

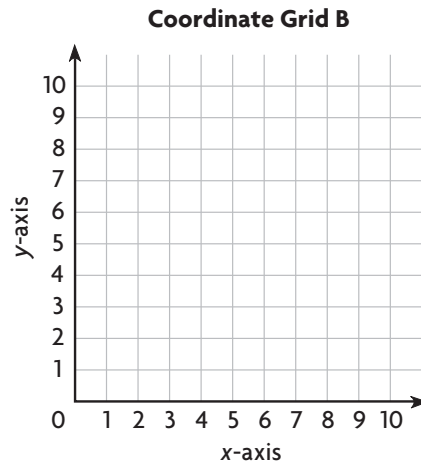
Use Coordinate Grid A to write an ordered pair for the given point.

- 1. A **(2, 3)**
- 2. B
- 3. C
- 4. D
- 5. E
- 6. F



Plot and label the points on Coordinate Grid B.

- 7. N (7, 3)
- 8. R (0, 4)
- 9. O (8, 7)
- 10. M (2, 1)
- 11. P (5, 6)
- 12. Q (1, 5)



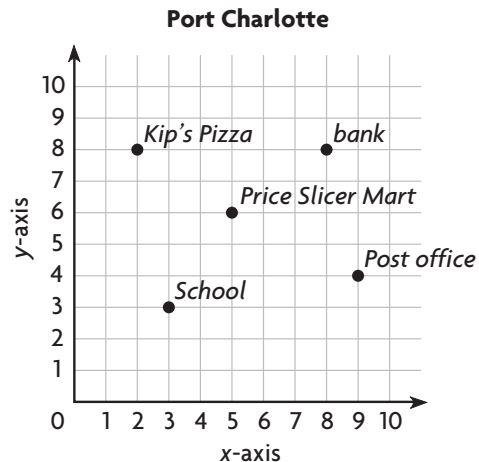
Problem Solving



Use the map for 13–14.

- 13. Which building is located at (5, 6)?

- 14. What is the distance between Kip's Pizza and the bank?



Graph Data

Graph the data on the coordinate grid.

Plant Growth				
End of Week	1	2	3	4
Height (in inches)	4	7	10	11

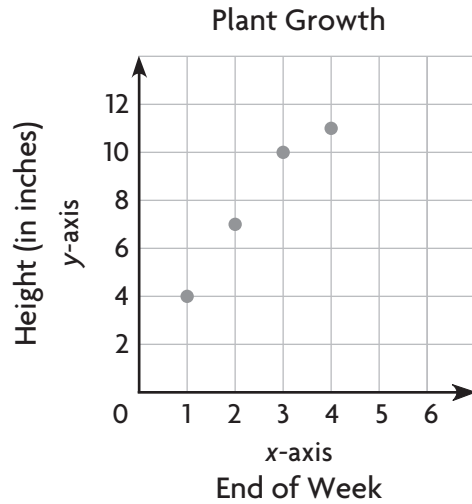
- Choose a title for your graph and label it. You can use the data categories to name the x- and y-axis.

- Write the related pairs of data as ordered pairs.

(1, 4), (2, 7)

(3, 10), (4, 11)

- Plot the point for each ordered pair.



Graph the data on the coordinate grid. Label the points.

1.

Distance of Bike Ride				
Time (in minutes)	30	60	90	120
Distance (in miles)	9	16	21	27

Write the ordered pair for each point.

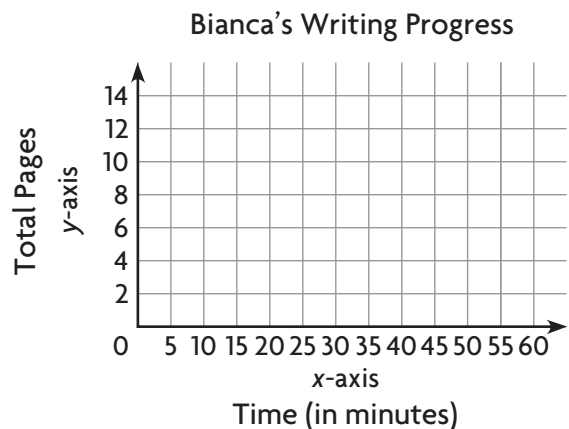
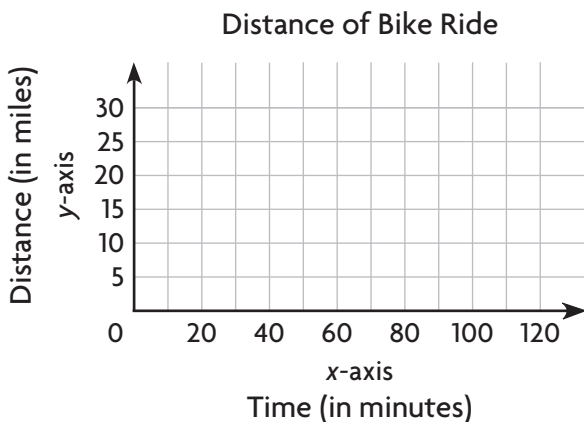
(_____, _____), (_____, _____)
 (_____, _____), (_____, _____)

2.

Bianca's Writing Progress				
Time (in minutes)	15	30	45	60
Total Pages	1	3	9	11

Write the ordered pair for each point.

(_____, _____), (_____, _____)
 (_____, _____), (_____, _____)



Graph Data

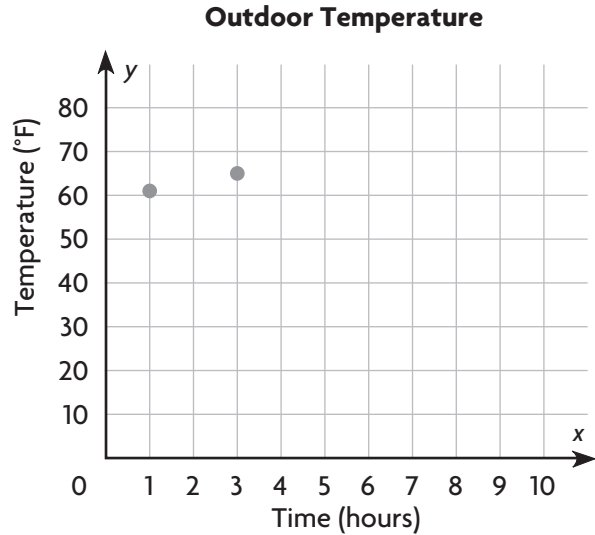
Graph the data on the coordinate grid.

1.

Outdoor Temperature					
Hour	1	3	5	7	9
Temperature (°F)	61	65	71	75	77

a. Write the ordered pairs for each point.

b. How would the ordered pairs be different if the outdoor temperature were recorded every hour for 4 consecutive hours?



Problem Solving

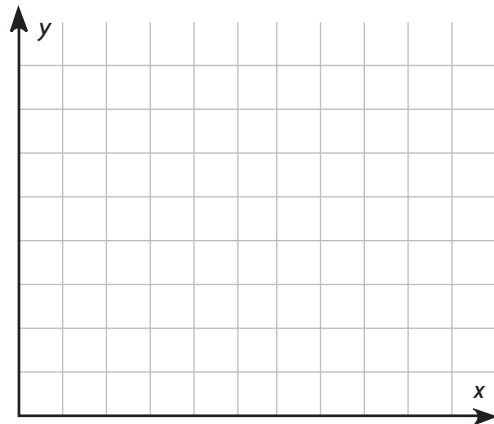


2.

Windows Repaired					
Day	1	2	3	4	5
Total Number Repaired	14	30	45	63	79

a. Write the ordered pairs for each point.

b. What does the ordered pair (2, 30) tell you about the number of windows repaired?



Name _____

Line Graphs

A **line graph** uses a series of line segments to show how a set of data changes over time. The **scale** of a line graph measures and labels the data along the axes. An **interval** is the distance between the numbers on an axis.

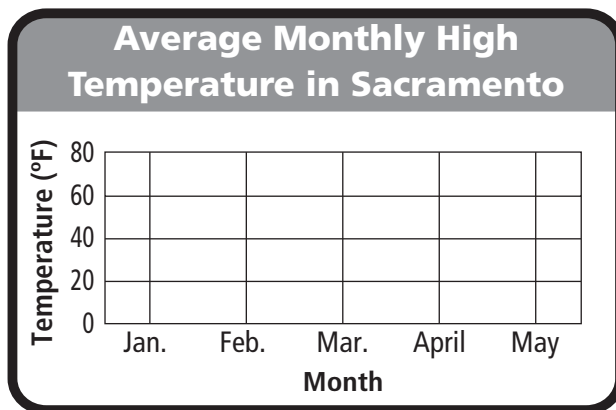
Use the table to make a line graph.

- Write a title for your graph. In this example, use **Average Monthly High Temperature in Sacramento**.
- Draw and label the axes of the line graph. Label the horizontal axis **Month**. Write the months. Label the vertical axis **Temperature (°F)**.
- Choose a scale and an interval. The range is 53–80, so a possible scale is 0–80, with intervals of 20.
- Write the related pairs of data as ordered pairs: **(Jan, 53); (Feb, 60); (Mar, 65); (April, 71); (May, 80)**.

Average Monthly High Temperature in Sacramento, California

Month	Jan.	Feb.	Mar.	April	May
Temperature (°F)	53	60	65	71	80

1. Make a line graph of the data above.



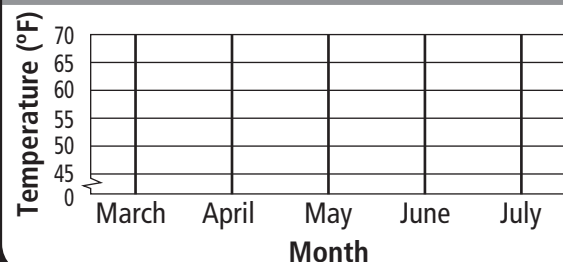
Use the graph to determine between which two months the least change in average high temperature occurs.

2. Make a line graph of the data in the table.

Average Low Temperature in San Diego, California

Month	Mar.	April	May	June	July
Temperature (°F)	51	51	60	62	66

Average Low Temperature in San Diego



Use the graph to determine between which two months the greatest change in average low temperature occurs.

Line Graphs

Use the table for 1–5.

Hourly Temperature							
Time	10 A.M.	11 A.M.	12 noon	1 P.M.	2 P.M.	3 P.M.	4 P.M.
Temperature (°F)	8	11	16	27	31	38	41

1. Write the related number pairs for the hourly temperature as ordered pairs.

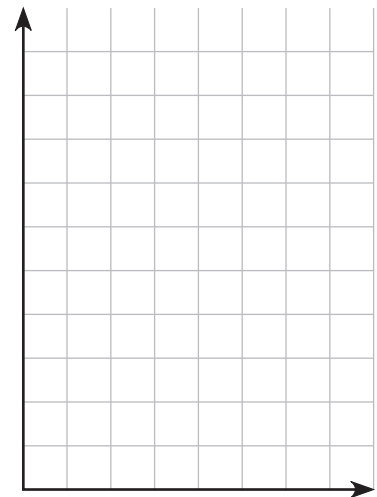
(10, 8);

2. What scale would be appropriate to graph the data?

3. What interval would be appropriate to graph the data?

4. Make a line graph of the data.

5. Use the graph to find the difference in temperature between 11 A.M. and 1 P.M.



Problem Solving 

6. Between which two hours did the least change in temperature occur?

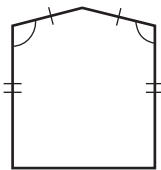
7. What was the change in temperature between 12 noon and 4 P.M.?

Polygons

A **polygon** is a closed plane figure formed by three or more line segments that meet at points called vertices. You can classify a polygon by the number of sides and the number of angles that it has.

Congruent figures have the same size and shape. In a **regular polygon**, all sides are congruent and all angles are congruent.

Classify the polygon below.



Polygon	Sides	Angles	Vertices
Triangle	3	3	3
Quadrilateral	4	4	4
Pentagon	5	5	5
Hexagon	6	6	6
Heptagon	7	7	7
Octagon	8	8	8
Nonagon	9	9	9
Decagon	10	10	10

How many sides does this polygon have? 5 sides

How many angles does this polygon have? 5 angles

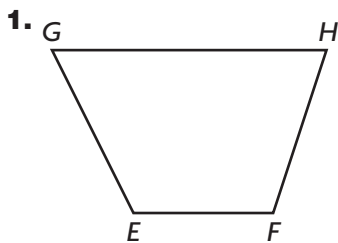
Name the polygon. pentagon

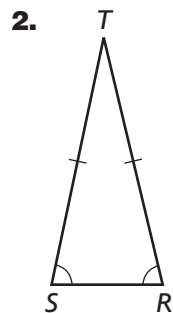
Are all the sides congruent? no

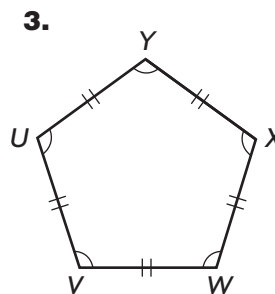
Are all the angles congruent? no

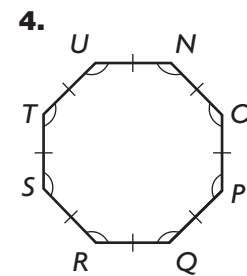
So, the polygon above is a pentagon. It is *not* a regular polygon.

Name each polygon. Then tell whether it is a *regular polygon* or *not a regular polygon*.



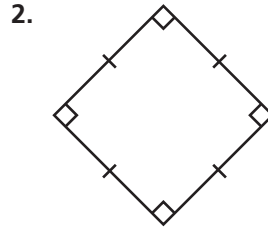
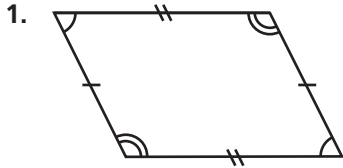




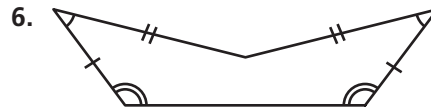
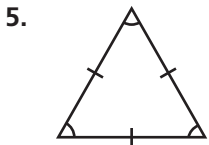
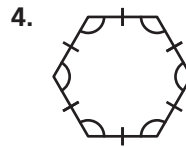


Polygons

Name each polygon. Then tell whether it is a *regular polygon* or *not a regular polygon*.



4 sides, 4 vertices, 4 angles means it is a **quadrilateral**. The sides are not all congruent, so it is **not regular**.



Problem Solving



7. Sketch nine points. Then, connect the points to form a closed plane figure. What kind of polygon did you draw?

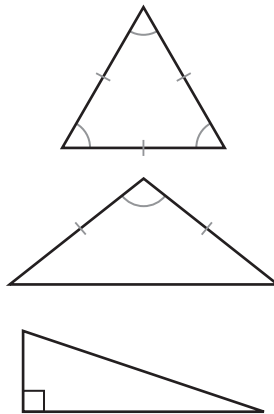
8. Sketch seven points. Then, connect the points to form a closed plane figure. What kind of polygon did you draw?

Triangles

You can classify triangles by the length of their sides and by the measure of their angles. **Classify each triangle.**

Use a ruler to measure the side lengths.

- **equilateral triangle**
All sides are the same length.
- **isosceles triangle**
Two sides are the same length.
- **scalene triangle**
All sides are different lengths.



Use the corner of a sheet of paper to classify the angles.

- **acute triangle**
All three angles are acute.
- **obtuse triangle**
One angle is obtuse. The other two angles are acute.
- **right triangle**
One angle is right. The other two angles are acute.

Classify the triangle according to its side lengths.

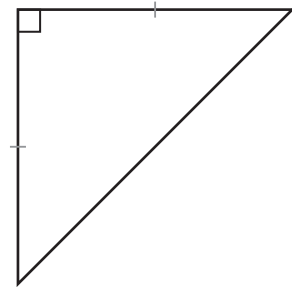
It has two congruent sides.

The triangle is an isosceles triangle.

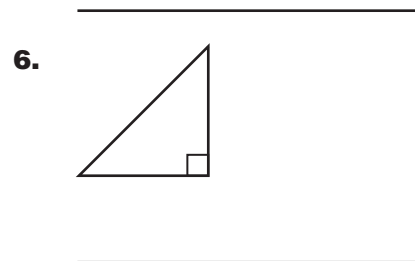
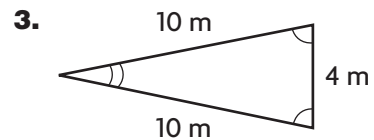
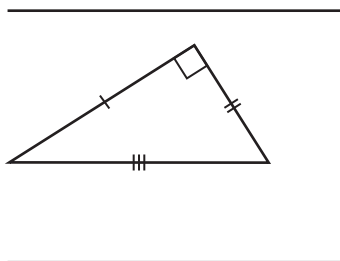
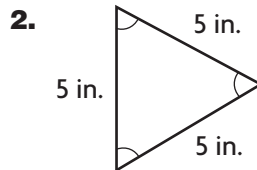
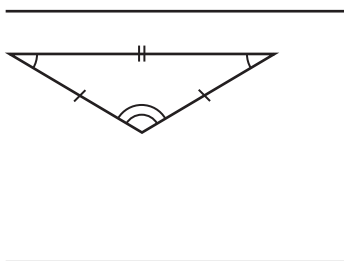
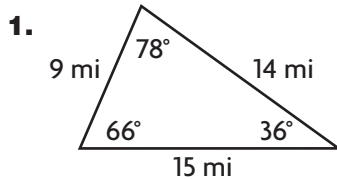
Classify the triangle according to its angle measures.

It has one right angle.

The triangle is a right triangle.

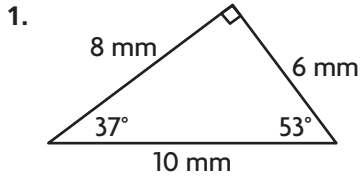


Classify each triangle. Write *isosceles*, *scalene*, or *equilateral*. Then write *acute*, *obtuse*, or *right*.

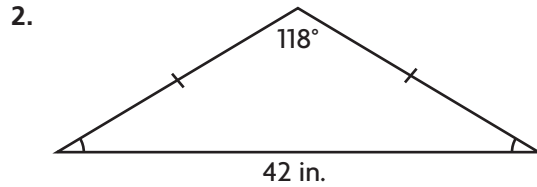


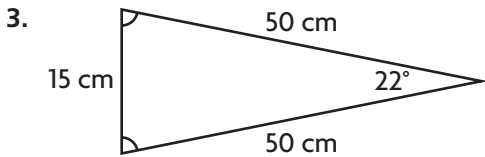
Triangles

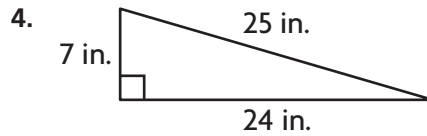
Classify each triangle. Write *isosceles*, *scalene*, or *equilateral*. Then write *acute*, *obtuse*, or *right*.



None of the side measures are equal. So, it is **scalene**. There is a right angle, so it is a **right** triangle.







A triangle has sides with the lengths and angle measures given. Classify each triangle. Write *scalene*, *isosceles*, or *equilateral*. Then write *acute*, *obtuse*, or *right*.

5. sides: 44 mm, 28 mm, 24 mm
angles: 110°, 40°, 30°

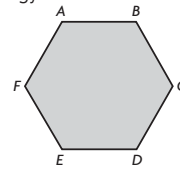
6. sides: 23 mm, 20 mm, 13 mm
angles: 62°, 72°, 46°

Problem Solving

7. Mary says the pen for her horse is an acute right triangle. Is this possible? **Explain.**

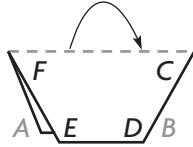
8. Karen says every equilateral triangle is acute. Is this true? **Explain.**

Lesson Objective: Solve problems using the strategy *act it out*.



Problem Solving • Properties of Two-Dimensional Figures

Haley thinks hexagon $ABCDEF$ has 6 congruent sides, but she does not have a ruler to measure the sides. Are the 6 sides congruent?

Read the Problem	Solve the Problem
<p>What do I need to find?</p> <p>I need to determine if sides <u>$AB, BC, CD, DE, EF, \text{ and } FA$</u> have the <u>same length</u>.</p>	<p>Trace the hexagon and cut out the shape.</p> <p>Step 1 Fold the hexagon to match the sides AB and ED, sides FE and FA, and sides CD and CB.</p>
<p>What information do I need to use?</p> <p>The figure is a <u>hexagon</u> with <u>6</u> sides and <u>6 congruent</u> angles.</p>	 <p>The sides match, so they are congruent.</p>
<p>How will I use the information?</p> <p>I will <u>act it out by tracing the figure and then folding the figure</u> to match all the sides to see if they are <u>congruent</u>.</p>	<p>Step 2 Fold along the diagonal between B and E to match sides BA and BC, sides AF and CD, and sides EF and ED. Fold along the diagonal between A and D to match sides AF and AB, sides FE and BC, and sides DE and DC.</p> <p>Step 3 Use logic to match sides AB and CD, sides AB and EF, sides BC and DE, and sides DE and FA.</p> <p>The sides match, so they are congruent.</p>

1. Justin thinks square $STUV$ has 4 congruent sides, but he does not have a ruler to measure the sides. Are the sides congruent? **Explain.**

2. Esther knows octagon $OPQRSTUW$ has 8 congruent angles. How can she determine whether the octagon has 8 congruent sides without using a ruler?

Problem Solving • Properties of Two-Dimensional Figures

Solve each problem.

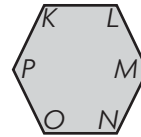
1. Marcel thinks that quadrilateral $ABCD$ at the right has two pairs of congruent sides, but he does not have a ruler to measure the sides. How can he show that the quadrilateral has two pairs of congruent sides?



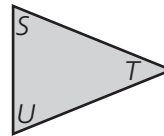
He can fold the quadrilateral in half both ways. If both sets of sides match, then they are congruent.

2. If what Marcel thinks about his quadrilateral is true, what type of quadrilateral does he have? _____

3. Richelle drew hexagon $KLMNOP$ at the right. She thinks the hexagon has six congruent angles. How can she show that the angles are congruent without using a protractor to measure them?



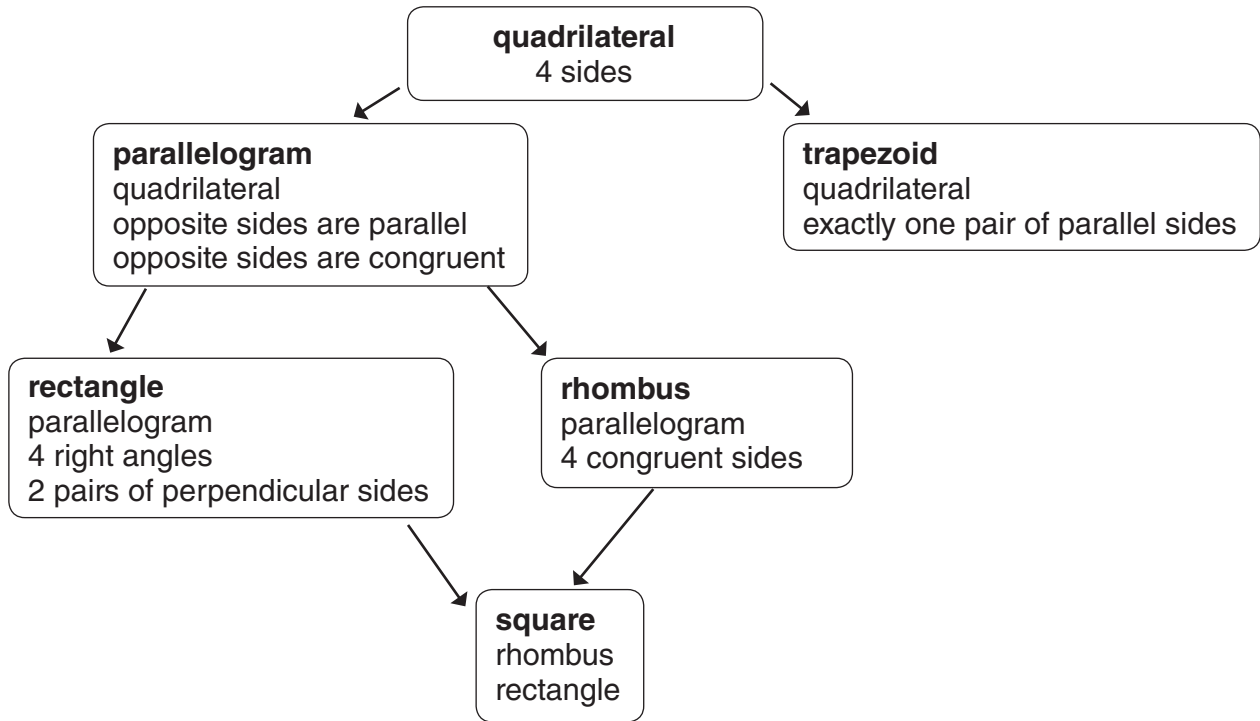
4. Jerome drew a triangle with vertices S , T , and U . He thinks $\angle TSU$ and $\angle TUS$ are congruent. How can Jerome show that the angles are congruent without measuring the angles?



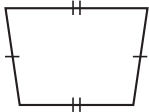
5. If Jerome is correct, what type of triangle did he draw?

Quadrilaterals

You can use this chart to help you classify quadrilaterals.



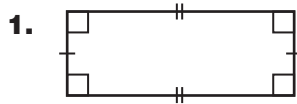
Classify the figure.

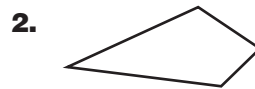


The figure has 4 sides, so it is a *quadrilateral*. The figure has exactly one pair of parallel sides, so it is a *trapezoid*.

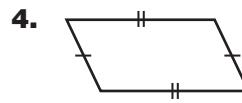
quadrilateral, trapezoid

Classify the quadrilateral in as many ways as possible. Write *quadrilateral*, *parallelogram*, *rectangle*, *rhombus*, *square*, or *trapezoid*.





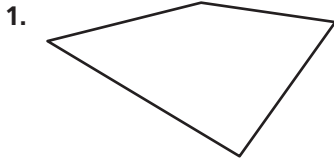




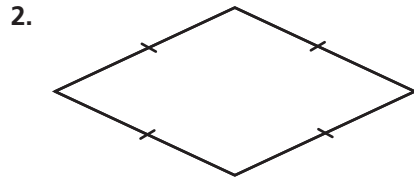
Quadrilaterals

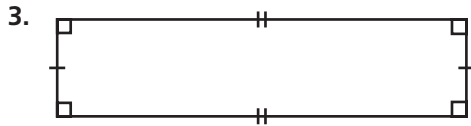
Classify the quadrilateral in as many ways as possible.

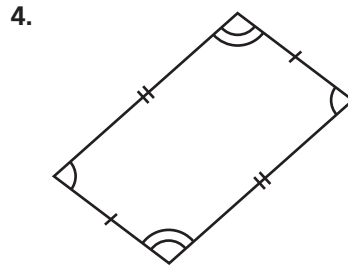
Write *quadrilateral*, *parallelogram*, *rectangle*, *rhombus*, *square*, or *trapezoid*.

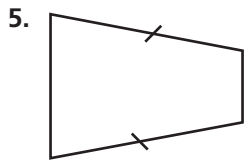


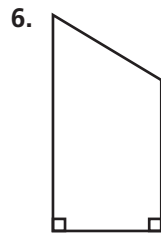
It has 4 sides, so it is a quadrilateral.
None of the sides are parallel, so there is
no other classification.











Problem Solving

7. Kevin claims he can draw a trapezoid with three right angles. Is this possible? **Explain.**

8. "If a figure is a square, then it is a regular quadrilateral." Is this true or false? **Explain.**

