6th Grade Intensive Math

6th Grade

STUDENT PACKET

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LESSON **Practice A**

2-1 *Properties and Mental Math*

Choose the letter of the equation that shows the given property.

1. Associative Property

    A $2 + 3 = 3 + 2$

    B $7 \times 8 = 7 \times (4 + 4)$

    C $8 \times (6 \times 5) = (8 \times 6) \times 5$

    D $9 \times (2 + 4) = (9 \times 2) + (9 \times 4)$

2. Distributive Property

    F $3 \times (6 \times 11) = (3 \times 6) \times 11$

    G $75 + 15 = 15 + 75$

    H $9 \times 8 = 8 \times 9$

    I $12 \times (4 + 7) = (12 \times 4) + (12 \times 7)$

3. Commutative Property

    A $3 \times (7 + 8) = 3 \times 15$

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

    C $(9 + 2) \times 5 = (9 \times 5) + (2 \times 5)$

    D $6 \times 5 = 5 \times 6$

4. Associative Property

    F $20 \times (3 + 3) = (20 \times 3) + (20 \times 3)$

    G $4 + (3 + 9) = (4 + 3) + 9$

    H $(10 + 5) \times 7 = 15 \times 7$

    I $16 \times 8 = 8 \times 16$

Rewrite each expression using the named property.

5. $8 + 12$; Commutative Property

    _____

6. $(9 \times 6) \times 4$; Associative Property

    _____

7. $3 \times (5 + 2)$; Distributive Property

    _____

8. $2 \times (4 + 5)$; Distributive Property

    _____

Find each sum or product.

9. $7 + 15 + 3 + 5$

    _____

10. $7 \times 2 \times 5$

    _____

11. $4 \times 3 \times 5$

    _____

Multiply using the Distributive Property.

12. 4×38

    _____

13. 6×53

    _____

14. 8×42

    _____

15. Sue has $4, Tom has $11, Brian has $6, and Anita has $9. Use
    mental math to find how much money they have altogether.

    _____

16. Each minibus seats 14 people, and the school owns 5
    minibuses. Use mental math to find how many students can ride
    in the school's minibuses at the same time.

    _____

LESSON
2-1

Reading Strategies
Focus on Vocabulary

The Commutative, Associative, and Distributive Properties of mathematics can make it easier to use mental math.

Commutative Property—The word **commute** means **to exchange.** In mathematics, when **addends or factors exchange places,** the sum or product is not affected.

Addends change places	Factors change places
$13 + 18 + 17$	$4 \times 7 \times 5$
$13 + 17 + 18$	$4 \times 5 \times 7$
$30 \quad + 18 = 48$	$20 \quad \times 7 = 140$

Associative Property—The word **associate** means **to join.** In mathematics, **when addends or factors are joined, or grouped, with parentheses** in different ways, the sum or product is not affected.

Addends are grouped	Factors are grouped
$11 + 4 + 16$	$7 \times 8 \times 5$
$11 + (4 + 16)$	$7 \times (8 \times 5)$
$11 + \quad 20 \quad = 31$	$7 \times \quad 40 \quad = 280$

Distributive Property—The word **distribute** means **to give out.** In mathematics, you can **distribute a factor** over a sum without affecting the original product.

5×17 $\qquad$ $17 = 10 + 7$

$(5 \times 10) + (5 \times 7)$ $\qquad$ Distribute 5 as a factor.

$\qquad 50 + 35$ $\qquad$ Multiply.

$\qquad 85$ $\qquad$ Add.

Answer each question.

1. Rewrite $17 + 8 + 13$ using the Commutative Property, then compute.

   _____

2. Rewrite $9 \times 8 \times 5$ using the Associative Property, then compute.

   _____

3. Rewrite 7×28 using the Distributive Property, then compute.

   _____

LESSON 2-1

Review for Mastery
Properties and Mental Math

Commutative Property
Changing the order of addends does not change the sum.
$21 + 13 = 13 + 21$

Changing the order of factors does not change the product.
$5 \times 7 = 7 \times 5$

Associative Property
Changing the grouping of addends does not change the sum.
$(3 + 8) + 4 = 3 + (8 + 4)$

Changing the grouping of factors does not change the product.
$2 \times (7 \times 4) = (2 \times 7) \times 4$

Distributive Property
When you multiply a number by a sum, you can

• Find the sum and then multiply. $3 \times (8 + 4) = 3 \times 12 = 36$

or

• Multiply the number by each addend and then find the sum.
  $3 \times (8 + 4) = (3 \times 8) + (3 \times 4) = 24 + 12 = 36$

Identify the property shown.

1. $3 \times (2 \times 6) = (3 \times 2) \times 6$

_____

2. $7 + 18 = 18 + 7$

_____

3. $4 \times (8 + 5) = (4 \times 8) + (4 \times 5)$

_____

4. $11 \times 8 = 8 \times 11$

_____

5. $3 \times (8 + 4) = (3 \times 8) + (3 \times 4)$

_____

6. $(3 + 8) + 4 = 3 + (8 + 4)$

_____

Identify the property shown and the missing number in each equation.

7. $9 + 16 = y + 9$

_____

8. $4 \times (3 \times 2) = (4 \times n) \times 2$

_____

9. $3 \times (11 + 4) = (3 \times a) + (3 \times 4)$

_____

10. $6 \times (9 + 14) = (b \times 9) + (b \times 14)$

_____

LESSON **2-1**

Review for Mastery
Properties and Mental Math (continued)

Find each sum or product.

A. $8 + 9 + 22 + 31$

     $8 + 22 \; + \; 9 + 31$ Use the Commutative Property.

     $(8 + 22) + (9 + 31)$ Use the Associative Property.

       $30 \;\;\; + \;\;\; 40$ Use mental math to add.

           70

B. $5 \times 7 \times 4$

     $7 \times 5 \times 4$ Use the Commutative Property.

     $7 \times (5 \times 4)$ Use the Associative Property.

     7×20 Use mental math to multiply.

     140

Find each sum or product.

11. $3 + 58 + 27 + 22$ 12. $8 \times 3 \times 5$ 13. $5 \times 3 \times 4$

    _____   _____   _____

14. $54 + 32 + 78 + 106$ 15. $84 + 11 + 26 + 39$ 16. $10 \times 3 \times 7$

    _____   _____   _____

Find the product.

6×34

Step 1: Write one factor as a sum of two numbers.
     $6 \times 34 = 6 \times (30 + 4)$

Step 2: Use the Distributive Property.
     $6 \times (30 + 4) = (6 \times 30) + (6 \times 4)$

Step 3: Use mental math to multiply and add.
     $(6 \times 30) + (6 \times 4) = 180 + 24 = 204$

Use the Distributive Property to find each product.

17. 6×43 18. 12×34 19. 53×4 20. 74×8

    _____   _____   _____   _____

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Student Worksheet
Properties and Mental Math

Problem 1

I need to rearrange this equation, so I can add it in my head.

LOOK!

Look for sums of 10.

$$12 + 4 + 18 + 46$$

$$12 + 18 + 4 + 46$$

$$(12 + 18) + (4 + 46)$$

| 12 + 18 = 30 |

| 4 + 46 = 50 |

30   +   50

| 30 + 50 = 80 | 80

Problem 2

It would be easier to multiply by a multiple of 10.

$$4 \times 23$$

$$4 \times (20 + 3)$$ | 23 is the same as 20 + 3. |

Multiply 4 by each number.

$$(4 \times 20) + (4 \times 3)$$

80   +   12

92

Think and Discuss

1. In Problem 1, why did you group 12 and 18 together?

_____

2. Does it matter which number you add first in Problem 1? _____

3. In Problem 2, is it easier to multiply 23 × 4 or 20 × 4? _____

4. Which properties did you use in Problem 1? _____

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LESSON 2-2

Practice A

Variables and Expressions

Circle the letter of the correct answer.

1. Which of the following is an algebraic expression?

   A $4 + 13$

   B $10 \bullet (3 - 2)$

   C $15 \div 5$

   D $9 - n$

2. What is the variable in the expression $(16 + a) \bullet 5 - 4$?

   F 16

   G a

   H 5

   I n

3. Which of these expressions is a way to rewrite the algebraic expression $n \div 3$?

   A $\dfrac{n}{3}$

   B $n \bullet 3$

   C $3n$

   D $\dfrac{3}{n}$

4. Which of these expressions is not a way to rewrite the algebraic expression $n \bullet 4$?

   F $n(4)$

   G $n \bullet 4$

   H $\dfrac{4}{n}$

   I $4n$

Evaluate each expression to find the missing values in the tables.

5.

n	$n + 3$
1	4
2	
5	
7	
10	

6.

n	$n \bullet 2^2$
2	8
3	
5	
7	
8	

7. If $x = 3$, what is the value of the expression $6 \div x$?

   _____

8. If $x = 2$, what is the value of the expression $9 - x$?

   _____

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LESSON 2-2

Reading Strategies
Focus on Vocabulary

The word **vary** means **change.** In math, a **variable** is a letter that holds a place for numbers that change.

1. Give some examples of things that vary.

   _____

   _____

   _____

The opposite of variable is **constant.** Something that is constant never changes, such as the street number of your house or the number of inches in a foot.

2. Give some examples of things that are constant.

   _____

   _____

In English, we use words in expressions such as, "see you soon" or "have a good day." In math, we use numbers and symbols to write **expressions** for other numbers.

$10 + 3$ $\qquad\qquad$ $4 + 8 + 5$ $\qquad\qquad$ $2(8 + 5)$

3. Write a math expression for 14.

   _____

4. Write a math expression for 25.

   _____

An **algebraic expression** is a math expression that contains a variable.

$x + 5$ $\qquad\qquad$ $3n + 1$ $\qquad\qquad$ $8 - w$

For Exercises 5–8, write "yes" if the expression is an algebraic expression or "no" if it is not.

5. $n + 7$ _____

6. $8(y + 1)$ _____

7. $6 + (10 + 5)$ _____

8. $4x - 1$ _____

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Review for Mastery

Variables and Expressions

A variable is a letter or a symbol that stands for a number that can change. A constant is an amount that does not change.

A mathematical phrase that contains at least one variable is an algebraic expression. In the algebraic expression $x + 5$, x is a variable and 5 is a constant.

When you evaluate an algebraic expression, substitute a number for the variable and then find the value.

To evaluate the algebraic expression $m - 8$ for $m = 12$, first replace the variable m in the expression with 12.

$m - 8$
$12 - 8$

Then find the value of the expression.

$12 - 8 = 4$

The value of $m - 8$ is 4 when $m = 12$.

Evaluate each expression for the given value of the variable.

1. $x + 5$, for $x = 6$ 2. $3p$, for $p = 5$ 3. $z \div 4$, for $z = 24$ 4. $w - 7$, for $w = 15$

_____   _____   _____   _____

To find the missing values in a table, use the given values of the variable.

x	$4x$
3	12
4	
5	

Think: $x = 3$, so $4x = 4 \cdot 3 = 12$
Think: $x = 4$, so $4x = 4 \cdot 4 = 16$
Think: $x = 5$, so $4x = 4 \cdot 5 = 20$

Evaluate each expression to find the missing values in the tables.

5.

x	$x + 7$
3	10
5	
7	

6.

y	$y - 2$
9	
10	
14	

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Student Worksheet
Variables and Expressions

Problem 1

Find the missing values in the table.

Step 1: Find 6^2.

$$6^2 = 6 \cdot 6 = 36.$$

Step 2: Multiply $4 \times n$.

Step 3: Add.

n	$4 \times n + 6^2$	$4 \times n + 36$
1	40	$(4 \times 1) = 4$ $4 + 36 = 40$
2	☐	$(4 \times 2) = 8$ $8 + 36 = 44$
3	☐	$(4 \times 3) = 12$ $12 + 36 = 48$

So, the missing values are ☐ and ☐.

Problem 2

Find the missing values in the table.

l	w	$l \times w = $ *length* $\times$ *width*
4	2	$4 \times 2 = 8$ square units
5	2	$5 \times 2 = $ ☐ square units
6	2	$6 \times 2 = $ ☐ square units
7	2	$7 \times 2 = $ ☐ square units

So, the missing values are ☐, ☐,
and ☐.

Find the number of square units,
if $l = 10$ and $w = 2$.

_____

Think and Discuss

Use the table below for 1.

n	$4 \times n + 6^2$
1	40
4	☐
5	☐

1. Find the missing values. _____

Use the table below for 2.

l	w	$l \times w$
4	2	$4 \times 2 = 8$ square units
8	2	$8 \times 2 = $ ☐ square units
9	2	$9 \times 2 = $ ☐ square units

2. Find the missing values. _____

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LESSON
2-3
Practice A
Translating Between Words and Math

Circle the letter of the correct answer.

1. Which of the following is the solution to an addition problem?

    A product

    B sum

    C plus

    D add

2. Which of the following is the solution to a subtraction problem?

    F minus

    G times

    H difference

    I less

3. Which word phrase represents the following expression: 5 • 3?

    A the product of 5 and 3

    B 5 less than 3

    C the quotient of 5 and 3

    D the sum of 5 and 3

4. Which word phrase represents the following expression: $14 \div n$?

    F the difference of 14 and n

    G 14 more than n

    H take away n from 14

    I the quotient of 14 and n

Match each situation to its algebraic expression below.

   A. $8 \div x$ B. $8x$ C. $8 - x$ D. $x + 8$ E. $x - 8$ F. $x \div 8$

5. 8 take away x _____

6. x divided by 8 _____

7. the product of 8 and x _____

8. the quotient of 8 and x _____

9. 8 more than x _____

10. x decreased by 8 _____

11. Lily bought 14 beads and lost some of them. This situation is modeled by the expression $14 - x$. What does x represent in the expression?

    _____

    _____

12. The pet store put the same number of hamsters in 6 cages. This situation is modeled by the expression $6n$. What does n represent?

    _____

    _____

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LESSON
2-3

Reading Strategies
Use a Visual Map

Identifying word phrases for different operations can help you write algebraic expressions. This visual map shows the four different operations with key word phrases.

$x + 15$
• x plus 15
• add 15 to x
• the sum of x and 15
• 15 more than x
• x increased by 15

$4 \cdot y$ or $(4)(y)$ or $4y$
• 4 times y
• y multiplied by 4
• the product of 4 and y

**Word Phrases
for Algebraic Expressions**

$s - 6$
• 6 subtracted from s
• subtract 6 from s
• 6 less than s
• s decreased by 6
• take away 6 from s

$\dfrac{a}{2}$ or $a \div 2$
• a divided by 2
• the quotient of a with a divisor of 2
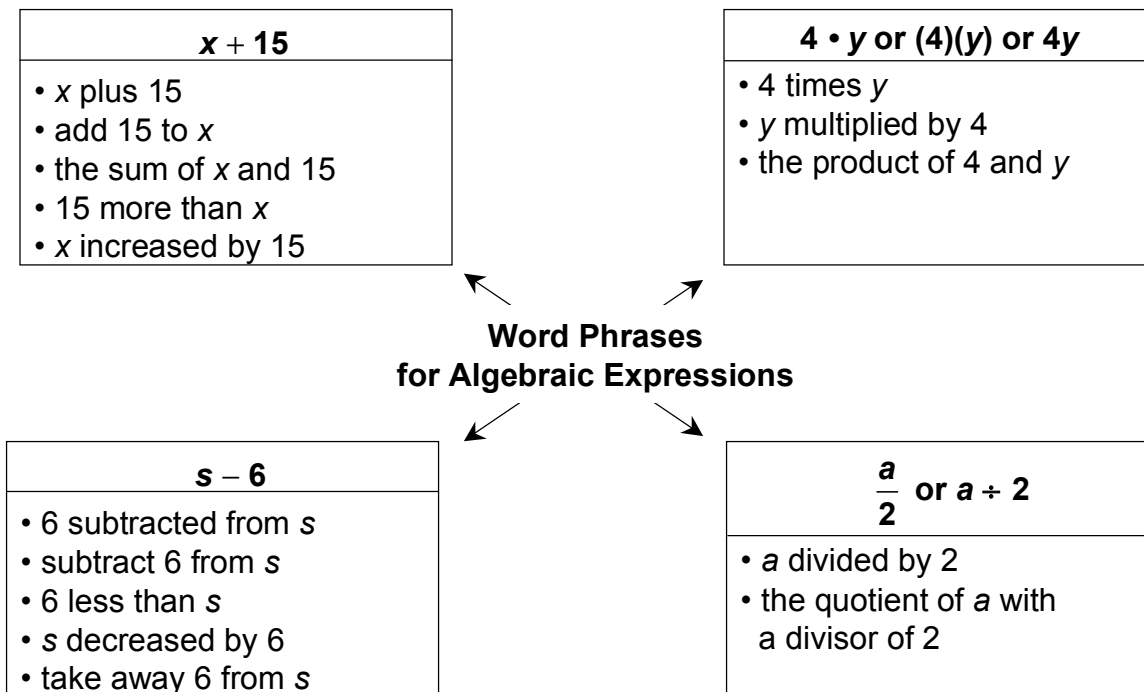
Write a word phrase for each algebraic expression.

1. $t - 8$ _____

2. $\dfrac{n}{6}$ _____

3. $5w$ _____

4. $z + 12$ _____

Write an algebraic expression for each word phrase.

5. the product of x and 12 _____

6. m decreased by 5 _____

7. the quotient of p with a divisor of 3 _____

8. 25 more than r _____

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LESSON 2-3

Review for Mastery

Translating Between Words and Math

There are key words that tell you which operations to use for
mathematical expressions.

Addition	Subtraction	Multiplication	Division
(combine)	(less)	(put together groups of equal parts)	(separate into equal groups)
add plus sum total increased by more than	minus difference subtract less than decreased by take away	product times multiply	quotient divide

You can use key words to help you translate between word phrases
and mathematical phrases.

A. 3 plus 5   **B.** 3 times x **C.** 5 less than p **D.** h divided by 6

   $3 + 5$ $3x$ $p - 5$ $h \div 6$

Write each phrase as a numerical or algebraic expression.

1. 4 less than 8   2. q divided by 3   3. f minus 6   4. d multiplied by 9

_____   _____   _____   _____

You can use key words to write word phrases for mathematical
phrases.

A. $7k$ **B.** $5 - 2$

• the product of 7 and k   • 5 minus 2

• 7 times k • 2 less than 5

Write a phrase for each expression.

5. $z \div 4$ 6. $5 \cdot 6$ 7. $m - 6$ 8. $s + 3$

_____   _____   _____   _____

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Student Worksheet
Translating Between Words and Math

Problem 1

Write an expression showing how much longer the Nile River is than the Amazon River.

NILE RIVER

length = n

4,000 miles $n - 4,000$
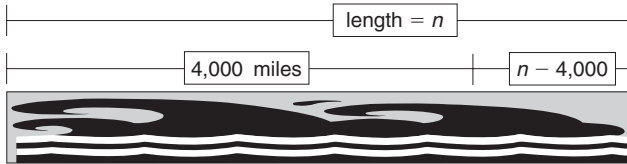
The expression is $n - 4,000$.

AMAZON RIVER

4,000 miles
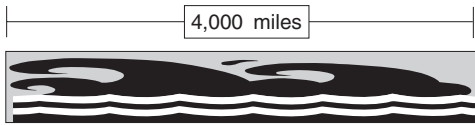
Problem 2

Write an expression.
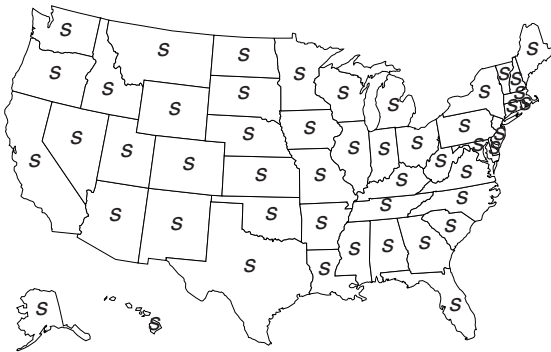
There are 50 states

There are s senators for each state.

$50s$

The total number of senators is <u>50 times s</u>.

Think and Discuss

1. Why does Problem 1 use subtraction?

_____

_____

2. Why does Problem 2 use multiplication?

_____

_____

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Name _____ Date _____ Class _____

Practice A

Translating Between Tables and Expressions

Circle the letter of the correct answer.

1. Which sentence about the table is true?

Cars	Wheels
1	4
2	8
3	12
c	$4c$

A The number of wheels is the number of cars plus 4.

B The number of wheels is the number of cars minus 4.

C The number of wheels is the number of cars divided by 4.

D The number of wheels is 4 times the number of cars.

2. Which sentence about the table is not true?

Brett's Age	Joy's Age
10	11
11	12
12	13
b	$b + 1$

F Joy's age is Brett's age plus 1.

G When Brett's age is b, Joy's age is $b + 1$.

H Add 1 to Brett's age to get Joy's age.

I Subtract 1 from Brett's age to get Joy's age.

Write an expression for the missing value in each table.

3.

Motorcycle	Wheels
1	2
2	4
3	6
m	

4.

Marbles	Bags
15	3
20	4
25	5
m	

Write an expression for the sequence in the table.

5.

Position	1	2	3	4	5	n
Value of Term	3	4	5	6	7	

6. What is the value of the term in position 6 in Exercise 5? _____.

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Reading Strategies
Identify Relationships

When you are **related** to someone, you are connected by something in common. When you look at the positions and the values of terms in a table, they are related, too. You can find the connection, or **relationship**. Then you can write an expression for the sequence.

Position	1	2	3	4	5	n
Value of Term	10	11	12	13	14	?

Read the value of the term in the first position. Note how it is related to its position.

1	+ 9	=	10
position 1	relationship between position and value of term		value of term in position 1
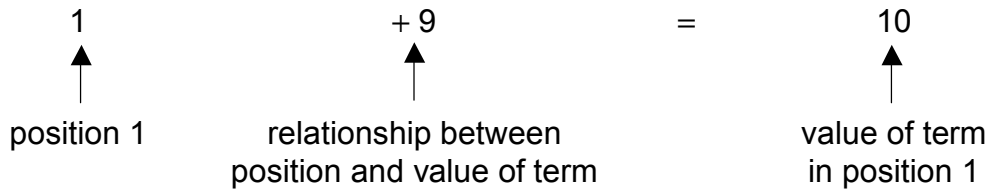
Check to see if the relationship works for the second position.

2	+ 9	=	11
position 2	relationship between position and value of term		value of term in position 2
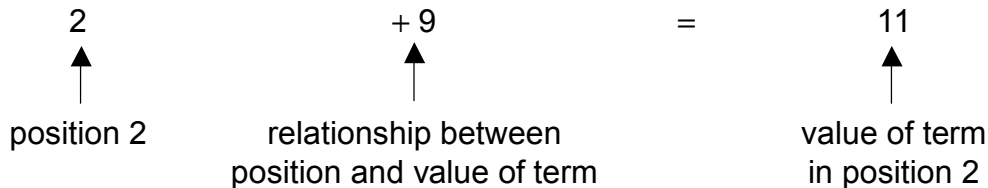
Check again. Use the value of the term in the third position.

3	+ 9	=	12
position 3	relationship between position and value of term		value of term in position 3
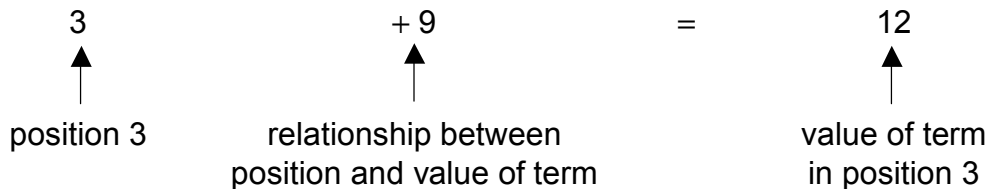
So, the expression for the sequence is $n + 9$.

Use this table to answer Exercises 1–6.

Position	1	2	3	4	5	n
Value of Term	5	10	15	20	25	?

1. How do you go from position 1 to the value of its term, 5? _____

2. Try the relationship for the next term. Can you add 4 to 2 and get 10?_____
   Does $n + 4$ work?_____

3. Try another relationship for postion 1 and its term.
   How else can you go from 1 to 5? _____

4. Try this relationship for the next term. Can you multiply 2 by 5 and get 10? _____

5. Check again by using the value of the term in the third position.
   Can you multiply 3 by 5 and get 15? _____

6. What is the expression for the sequence in the table? _____

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LESSON
2-4
Review for Mastery
Translating Between Tables and Expressions

You can write an expression for data in a table.
The expression must work for all of the data.

Cats	Legs
1	4
2	8
3	12
c	?

Think: When there is 1 cat, there are 4 legs. $4 \times 1 = 4$
When there are 2 cats, there are 8 legs. $4 \times 2 = 8$
When there are 3 cats, there are 12 legs. $4 \times 3 = 12$

So, when there are *c* cats, there are 4*c* legs.

You can write an expression for the sequence in a table.
Find a rule for the data in the table that works for the whole sequence.

Position	1	2	3	4	5	*n*
Value of Term	4	5	6	7	8	?

Step 1 Look at the value of the term in position 1.
4 is **3 more** than 1.
Step 2 Try the rule for position 2.
5 is **3 more** than 2.
Step 3 Try the rule for the rest of the positions.
6 is **3 more** than 3, 7 is **3 more** than 4, and 8 is **3 more** than 5.

So, the expression for the sequence is *n* + 3.

Write an expression for the missing value in each table.

1.

People	Legs
1	2
2	4
3	6
p	

2.

Yoko's Age	Mel's Age
9	19
10	20
11	21
y	

Write an expression for the sequence in each table.

3.

Position	1	2	3	4	5	*n*
Value of Term	3	6	9	12	15	

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Student Worksheet

LESSON 2-4 *Translating Between Tables and Expressions*

Problem 1

1 player and 1 game board = 32 pieces
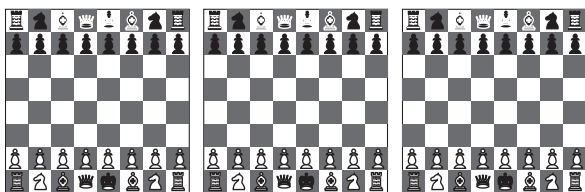
1 player and 3 game boards = 96 pieces

Think!
$32 \times 3 = 96$

$32 + 32 + 32 = 96$

What is happening to the chess pieces?

They are multiplying.

Complete.

$32 + 32 + 32 + 32 + 32 = $ _____

$32 \times 5 = $ _____

Problem 2

Remember

• An *expression* uses numbers and operation signs.

• A *value* is a specific number for an expression.

• A *sequence* is an ordered set of numbers.

n = Reilly's age

$n + 2$ = Ashley's age

When Reilly is 12, how old will Ashley be?

$n + 2 = 12 + 2$

When Reilly is 12, the value of $n + 2$ is 14.

So, Ashley will be 14 years old.

Think and Discuss

1. How many chess pieces will there be when 6 games of chess are played at the same time?

2. What is the expression for the sequence in the table?

Reilly's Age	Ashley's Age
4	9
5	10
6	11

18

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LESSON 3-1

Practice A

Representing, Comparing, and Ordering Decimals

Write the value of the underlined digit in each number.

1. 1.<u>6</u>

2. <u>7</u>.62

3. 3.6<u>9</u>

_____   _____   _____

4. <u>2</u>0.4

5. 5.<u>1</u>36.

6. 5.0<u>8</u>

_____   _____   _____

Write each decimal in standard form, expanded form, and words.

7. 1.8 _____

8. $3 + 0.6 + 0.02$ _____

9. one and fifty-two hundredths _____

Circle the letter of the correct answer.

10. Which of the following sets is written in order from greatest to least?

  A 1.7, 1.07, 17

  B 5.2, 2.5, 0.52

  C 1.07, 17, 1.7

  D 2.5, 0.52, 5.2

11. Which of the following sets is written in order from least to greatest?

  F 0.85, 8.5, 5.8

  G 4.3, 3.4, 0.43

  H 5.8, 0.85, 8.5

  I 0.43, 3.4, 4.3

12. Reno, Nevada, gets an average of only five-tenths inch of rain in June, and only three-tenths inch of rain in July. Which month in Reno has less rain?

_____

13. Honolulu, Hawaii, gets an average of three and eight tenths inches of rain in December, and three and six tenths inches of rain in January. Which month in Honolulu has more rain?

_____

Holt McDougal Mathematics

LESSON
3-1

Reading Strategies
Connect Symbols and Words

You can read and write decimals in three ways. A place value chart
can help you read decimals.

When you read or say a decimal, say "and" when you come to the
decimal point.

Ones	Tenths	Hundredths
2 .	5	
0 .	1	7
8 .	0	6

Read:

2 **and** 5 tenths

17 hundredths

8 **and** 6 hundredths

Use this chart to help you write decimals in standard form and in
expanded form.

Words and Symbols	Standard Form	Expanded Form
2 and 5 tenths	2.5	2 + 0.5
17 hundredths	0.17	0.1 + 0.07
8 and 6 hundredths	8.06	8 + 0.06

**Write each decimal in words and symbols, standard form,
or expanded form.**

1. Write 2.17 with words and symbols. _____

2. Write 2.17 in expanded form. _____

3. Write 3 and 6 hundredths in standard form. _____

4. Write 3 and 6 hundredths in expanded form. _____

5. Write 1.5 with words and symbols. _____

6. Write 1.5 in expanded form. _____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Review for Mastery
Representing, Comparing, and Ordering Decimals

You can use place value to write decimals
in standard form, expanded form, and word form.

To write 2.14 in expanded form, write the decimal
as an addition expression using the place value
of each digit.

2.14 can be written as $2 + 0.1 + 0.04$.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
2	1	4		

When you write a decimal in word form, the number
before the decimal point tells you how many wholes
there are. The decimal point stands for the word "and."

Notice that the place value names to the right of the decimal begin
with tenths, hundredths, and then thousandths. The "ths" ending
indicates a decimal.

2.14 can also be written as *two and fourteen hundredths.*

1. How would you read a number with 4 decimal places to the right of the decimal
point?

_____

**Write each decimal in standard form, expanded form, and
word form.**

2.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
5	6	9	8	

_____

_____

_____

3.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
0	0	9	4	

_____

_____

_____

4. $7 + 0.8$

_____

_____

5. twelve hundredths

_____

_____

Holt McDougal Mathematics

LESSON 3-1

Review for Mastery

Representing, Comparing, and Ordering Decimals (cont.)

You can use place value to compare decimals.
Use < or > to compare the decimals.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
3	7	6	8	
3	7	5	4	

0.06 > 0.05, so 3.768 > 3.754.

Compare. Write >, <, or =.

6.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
1	0	3		
1	3			

1.03 ____ 1.3

7.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
4	6	7		
4	6	7	0	

4.67 ____ 4.670

8.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
0	3	6	4	5
0	3	4	6	5

0.3645 ____ 0.3465

9. 8.53 ____ 8.053

10. 2.253 ____ 2.1345

11. 0.87 ____ 0.08703

You can use place value to order decimals.

To order 9.76, 8.59, and 9.24, from least to greatest,
first compare the numbers in pairs.

Ones	Tenths	Hundredths	Thousandths	Ten Thousandths
9	7	6		
8	5	9		
9	2	4		

9.76 > 8.59, 8.59 < 9.24, 9.76 > 9.24.

So the numbers from least to greatest are 8.59, 9.24, 9.76.

Order the decimals from least to greatest.

12. 0.54, 0.43, 0.52

13. 3.43, 3.34, 3.4

14. 8.9, 9.8, 9.5

_____

_____

_____

15. 0.83, 0.8, 0.083

16. 1.1, 0.01, 1.01

17. 6.5, 6.0, 0.6

_____

_____

_____

Name _____ Date _____ Class _____

Student Worksheet
3-1 *Representing, Comparing, and Ordering Decimals*

Problem 1

Place value charts can help you read and write decimals.

A.

ones	tenths	hundredths	thousandths	ten-thousandths
1.	0	5		

B.

ones	tenths	hundredths	thousandths	ten-thousandths
0.	0	5	1	7
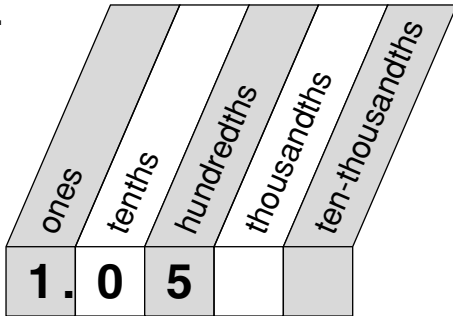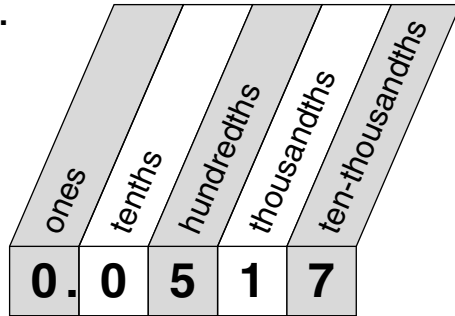
Problem 2

Which number is larger? **0.12** or **0.50**

First, line up the decimal points.
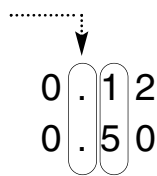
```
0 . 1 2
0 . 5 0
```
So, 0.12 < 0.50.

Compare each digit.
Is 1 < 5?

Think and Discuss

1. In Problem 1 what word does the decimal point refer to?

_____

2. Why should you align the decimal point when comparing and
ordering decimals?

_____

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Holt McDougal Mathematics

GUIDED PRACTICE

See Example 1 Write each decimal in standard form, expanded form, and words.

1. 1.98

2. ten and forty-one thousandths

3. 0.07 + 0.006 + 0.0005

4. 0.0472

See Example 2 **5.** **Physical Science** Osmium and iridium are precious metals. The density of osmium is 22.58 g/cm^3, and the density of iridium is 22.56 g/cm^3. Which metal is denser?

See Example 3 Order the decimals from least to greatest.

6. 9.5, 9.35, 9.65

7. 4.18, 4.1, 4.09

8. 12.39, 12.09, 12.92

INDEPENDENT PRACTICE

See Example 1 Write each decimal in standard form, expanded form, and words.

9. 7.0893

10. 12 + 0.2 + 0.005

11. seven and fifteen hundredths

12. 3 + 0.1 + 0.006

See Example 2 **13.** **Astronomy** Two meteorites landed in Mexico. The one found in Bacuberito weighed 24.3 tons, and the one found in Chupaderos weighed 26.7 tons. Which meteorite weighed more?

See Example 3 Order the decimals from least to greatest.

14. 15.25, 15.2, 15.5

15. 1.56, 1.62, 1.5

16. 6.7, 6.07, 6.23

PRACTICE AND PROBLEM SOLVING

Write each number in words.

17. 9.007

18. 5 + 0.08 + 0.004

19. 10.022

20. 4.28

21. 142.6541

22. 0.001 + 0.0007

23. 0.92755

24. 1.02

Compare. Write <, >, or =.

25. $8.04 ▨ $8.40

26. 0.907 ▨ 0.6801

27. 1.246 ▨ 1.29

28. one and fifty-two ten-thousandths ▨ 1.0052

29. ten and one hundredth ▨ 10.100

Write the value of the red digit in each number.

30. 3.02**6**

31. 17.5**3**703

32. 0.000**5**98

33. 425.**1**055

Order the numbers from greatest to least.

34. 32.525, 32.5254, 31.6257

35. 0.34, 1.43, 4.034, 1.043, 1.424

36. 1.01, 1.1001, 1.101, 1.0001

37. 652.12, 65.213, 65.135, 61.53

O = **WORKED-OUT SOLUTIONS**
on p. WS3

Proxima Centauri, the closest star to Earth other than the Sun, was discovered in 1913. It would take about 115,000 years for a spaceship traveling from Earth at 25,000 mi/h to reach Proxima Centauri.

NEXT EXITS

MOON	238,855 mi
SUN	92,000,000 mi
PLUTO	2,700,000,000 mi
PROXIMA CENTAURI	24,000,000,000,000 mi

Use the table for Exercises 38–44.

38. Order the stars Sirius, Luyten 726-8, and Lalande 21185 from closest to farthest from Earth.

39. Which star in the table is farthest from Earth?

40. How far in light-years is Ross 154 from Earth? Write the answer in words and expanded form.

41. List the stars that are less than 5 light-years from Earth.

42. **? What's the Error?** A student wrote the distance of Proxima Centauri from Earth as "four hundred and twenty-two hundredths." Explain the error. Write the correct answer.

43. **Write About It** Which star is closer to Earth, Alpha Centauri or Proxima Centauri? Explain how you can compare the distances of these stars. Then answer the question.

Distance of Stars from Earth	
Star	**Distance (light-years)**
Alpha Centauri	4.35
Barnard's Star	5.98
Lalande 21185	8.22
Luyten 726-8	8.43
Proxima Centauri	4.22
Ross 154	9.45
Sirius	8.65

44. **Challenge** Wolf 359 is located 7.75 light-years from Earth. If the stars in the table were listed in order from closest to farthest from Earth, between which two stars would Wolf 359 be located?

Florida Spiral Review

45. **Multiple Choice** Which shows the numbers from least to greatest?

A. 0.32, 3.2, 0.23, 0.03   C. 3.2, 0.32, 0.23, 0.03

B. 0.03, 0.23, 0.32, 3.2   D. 0.03, 0.32, 0.23, 3.2

46. **Gridded Response** What number is shown on the number line?

```
0.0   0.4   0.8   1.2   1.6   2.0   2.4
```
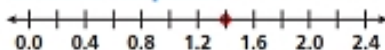
Use mental math to find each sum or product. (Lesson 2-1)

47. $14 + 20 + 6$ 48. $6 \times 80 \times 5$ 49. $28 + 14 + 12 + 21$ 50. $2 \times 12 \times 10 \times 5$

Solve each equation. (Lesson 2-7)

51. $n - 52 = 71$ 52. $30 = k - 15$ 53. $c - 22 = 30$

LESSON 3-2

Practice A

Estimating Decimals

Round each decimal to the underlined place value.

1. 1.7̲8

2. 0.56̲9

3. 12̲.62

_____

_____

_____

4. 3.2̲15

5. 24.60̲8

6. 37̲.84

_____

_____

_____

Estimate by rounding to the indicated place value.

7. 3.67 + 1.23; tenths

8. 0.726 + 0.119; hundredths

_____

_____

9. 12.86 − 5.73; tenths

10. 8.643 − 2.795; nearest whole number

_____

_____

Estimate each product or quotient.

11. 17.6 ÷ 6.2

12. 1.9 • 7.045

13. 23.8 ÷ 4.3

_____

_____

_____

14. 9.02 • 4.65

15. 36.1 ÷ 3.9

16. 2.8 • 5.35

_____

_____

_____

17. Latoya measured the growth of a plant for her science project. When she started the project, the plant was 2.8 inches tall. At the end of the project, the plant was 5.2 inches tall. About how many inches did the plant grow during Latoya's project?

_____

18. Tyler bought 16.2 yards of cloth to make costumes for the school play. He needs 3.8 yards of the cloth to make each costume. About how many costumes can Tyler make with the cloth he bought?

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Reading Strategies
Use Context

You estimate to get an approximate answer. Rounding decimals to the nearest whole number is one way to estimate.

Mike's mom bought 3.28 pounds of cheddar cheese. She also bought 2.75 pounds of Swiss cheese. About how many pounds of cheese did she buy?

To round to the nearest whole number, look at the tenths place.

3.**28** ←—— 2 is less than 5; round down to 3.

+2.**75** ←—— 7 is greater than 5; round up to 3.

3.28 + 2.75 rounded to the nearest whole number is:

↓ ↓

3 + 3 = 6 pounds of cheese.

Complete each problem.

1. Which decimal place value do you look at to round to the nearest whole number? _____

2. Round 34.67 pounds to the nearest pound. _____

3. Round 42.19 pounds to the nearest pound. _____

4. Estimate this sum: 42.19 pounds + 34.67 pounds. _____

5. Round $54.14 to the nearest dollar. _____

6. Round $21.54 to the nearest dollar. _____

7. Estimate the difference: $54.14 − $21.54. _____

Holt McDougal Mathematics

LESSON 3-2

Review for Mastery

Estimating Decimals

You can use rounding to estimate. Round to the indicated place value.
Then add or subtract.

A. 3.478 + 7.136; tenths
    3.4**7**8   7 ≥ 5, so round up   3.5
    7.1**3**6   3 < 5, so round down   +7.1
                                          10.6

    3.478 + 7.136 is about 10.6.

B. 12.848 – 6.124; hundredths
    12.8**4**8   8 ≥ 5, so round up   12.85
    6.1**2**4   4 < 5, so round down   –6.12
                                            6.73

    12.848 – 6.124 is about 6.73.

Estimate by rounding to the indicated place value.

1. 1.04 + 9.37; tenths

   1.04 rounds to _____

   9.37 rounds to _____

   estimate   _____

2. 2.17 + 3.56; tenths

   2.17 rounds to _____

   3.56 rounds to _____

   estimate   _____

3. 6.753 – 4.245; hundredths

   6.753 rounds to _____

   4.255 rounds to _____

   estimate   _____

You can use compatible numbers to estimate. Pick numbers that are
close to the actual numbers that are easy to multiply or divide. Then
multiply or divide.

A. 4.6 • 3.2
    5 and 3 are compatible numbers.
    5 • 3 = 15, so 4.6 • 3.2 is about 15.

B. 48.3 ÷ 13.2
    48 and 12 are compatible numbers.
    48 ÷ 12 = 4, so 48.3 ÷ 13.2 is
    about 4.

Use compatible numbers to estimate each product or quotient.

4. 9.4 • 5.6   5. 7.25 • 10.84   6. 84.8 ÷ 3.9   7. 21.9 ÷ 3.1

   _____   _____   _____   _____

8. 8.3 • 7.6   9. 55.7 ÷ 6.9   10. 5.57 ÷ 2.7   11. 6.729 • 9.8

   _____   _____   _____   _____

Name _____ Date _____ Class _____
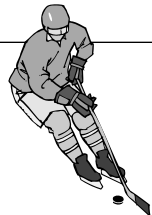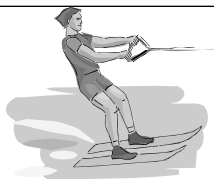
Student Worksheet
Estimating Decimals

Problem 1

What number do these decimals cluster around?

198.45 calories	210.6 calories	194.4 calories		
↓	↓	↓		
200 calories	+ 200 calories	+ 200 calories	=	600 calories

Problem 2

Estimate by rounding.

When rounding to the ones place, look to the digit to the right of the ones place.

L∞K!

$$3.\textbf{9}2 + 6.\textbf{4}8$$

9 > 5, so round 3.92 up.   4 + 6 = 10   4 < 5, so round 6.48 down.

Think and Discuss

1. Explain why clustering is a good way to estimate the number of calories in Problem 1.

_____

_____

2. Explain why you rounded 6.48 to 6 in Problem 2.

_____

_____

_____

32

LESSON 3-3

Practice A

Adding and Subtracting Decimals

Find each sum or difference.

1. $1.5 + 2.3$

_____

2. $6.5 + 1.4$

_____

3. $8.9 - 5.1$

_____

4. $12.6 - 3.4$

_____

5. $8.16 - 7.02$

_____

6. $7.25 + 8.75$

_____

7. $11.4 + 8.6$

_____

8. $16.5 - 4.3$

_____

9. $9.55 - 1.2$

_____

10. $25.6 + 5.1$

_____

11. $8.9 + 3.05$

_____

12. $10.64 - 8.5$

_____

Circle the letter of the correct answer.

13. If $x = 2.3$, what is the value of the expression $5.4 + x$?

   A 3.1   C 7.1

   B 7.7   D 3.7

14. If $a = 4.2$, what is the value of the expression $8.7 - a$?

   F 12.9   H 4.5

   G 4.9   I 12.5

15. If $m = 1.9$, what is the value of the expression $m + 4.2$?

   A 2.3   C 6.1

   B 2.2   D 7.1

16. If $y = 5.9$, what is the value of the expression $7.2 - y$?

   F 1.3   H 13.3

   G 1.7   I 13.1

17. Marcus is 1.5 meters tall. His sister, Carol, is 0.1 meter taller than Marcus. Their father is 0.2 meter taller than Carol. How tall is Carol? How tall is their father?

_____

18. Jennifer brought $14.75 to the baseball game. She spent $3.45 for a hot dog and soda. How much money does she have left?

_____

Holt McDougal Mathematics

LESSON
3-3

Reading Strategies
Use an Organizer

Writing decimals in a place-value grid helps you line up decimal
points to add or subtract decimals.

Ones	Tenths	Hundredths
1.	4	**0**
5.	3	8
+ 2.	7	**0**
9.	4	8

1.4**0**
5.38
+2.7**0**
9.48

Add zeros as place holders.

Place decimal point in answer.

28.05
– 6.3**0**
21.75

Tens	Ones	Tenths	Hundredths
2	8.	0	5
–	6.	3	**0**
2	1.	7	5

1. How does the place-value grid help you add or subtract?

_____

2. Place these numbers on the place-value grid below: 3.25, 1.06, 2.9.

Ones	Tenths	Hundredths
	.	
	.	
+	.	

3. Place this problem on the place-value grid below: 23.82 – 7.2.

Tens	Ones	Tenths	Hundredths
		.	
–		.	

4. Add the numbers on the place-value grid. What is the sum?

_____

_____

5. Subtract the numbers on the place-value grid. What is the difference?

_____

_____

6. For which numbers did you add zero as a place holder?

_____

Holt McDougal Mathematics

Name _____   Date _____   Class _____

Review for Mastery
Adding and Subtracting Decimals

You can use a place-value chart to help you add and subtract decimals.

Add 1.4 and 0.9.

Tens	Ones	Tenths	Hundredths	Thousandths
	1	4		
+	0	9		

So, 1.4 + 0.9 = 2.3.

Subtract 2.4 from 3.1.

Tens	Ones	Tenths	Hundredths	Thousandths
	3	1		
−	2	4		

So, 3.1 − 2.4 = 0.7.

Find each sum or difference.

1.

Tens	Ones	Tenths	Hundredths	Thousandths
	2	6		
+	1	1	5	

_____

2.

Tens	Ones	Tenths	Hundredths	Thousandths
	2	5	3	
−	1	7		

_____

3. 4.3 + 1.4

Tens	Ones	Tenths	Hundredths	Thousandths

_____

4. 14.4 − 3.8

Tens	Ones	Tenths	Hundredths	Thousandths

_____

5. 7.3 + 8.5

Tens	Ones	Tenths	Hundredths	Thousandths

_____

6. 12.34 − 6.9

Tens	Ones	Tenths	Hundredths	Thousandths

_____

7. 6.3 − 2.5

_____

8. 20.65 + 13.24

_____

9. 8.9 − 1.95

_____

10. 3.42 + 5.25

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Student Worksheet
Adding and Subtracting Decimals

Problem 1

How do I add decimals?

Step 1: Align the decimal points.

9 .7
9 .7
9 .3
9 .45
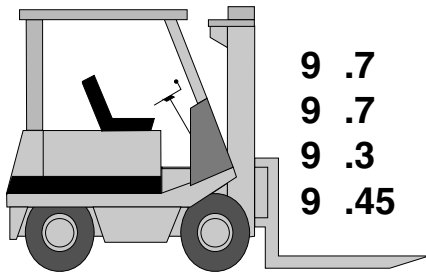
Step 2: Add zeros as placeholders.

9.70
9.70
9.30
9.45
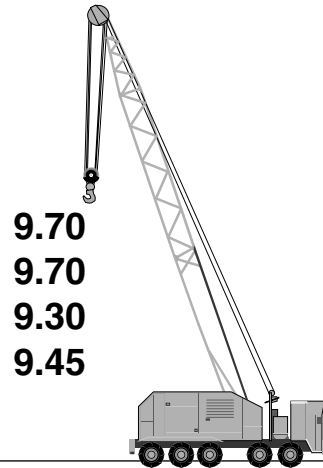
Step 3: Add one place at a time.
Then write the decimal.

```
   9.70
   9.70
   9.30
+  9.45
  38.15
```

Estimate to check.

```
  10  ✓
  10  ✓
   9  ✓
   9  ✓
  38
```
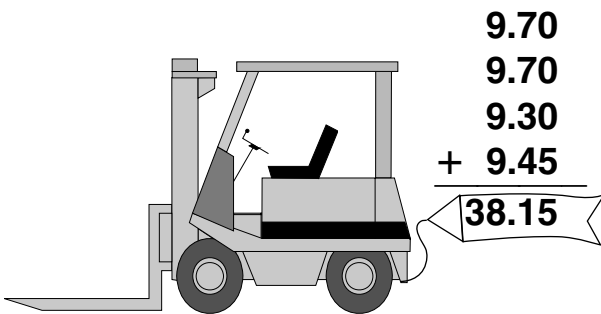
38 is close to 38.15.

Think and Discuss

1. How do you know that your answer to Problem 1 is reasonable?

_____

2. In Step 2 when you added the zeros, did the values of the
decimals change? Explain.

_____

_____

34   **Holt McDougal Mathematics**

LESSON 3-4

Practice A

Multiplying Decimals

Find each product.

1. 0.4
    × 0.2
    _____

2. 0.3
    × 0.4
    _____

3. 1.2
    × 0.5
    _____

4. 1.1
    × 0.9
    _____

5. 2.5
    × 0.5
    _____

6. 6.0
    × 0.7
    _____

7. $0.4 \cdot 0.5$

8. $1.2 \cdot 1.5$

9. $1.7 \cdot 0.3$

10. $6.7 \cdot 0.4$
    _____

11. $9.6 \cdot 0.2$
    _____

12. $0.8 \cdot 0.8$
    _____

Evaluate 2*x* for each value of *x*.

13. $x = 0.1$
    _____

14. $x = 0.5$
    _____

15. $x = 0.9$
    _____

16. $x = 1.2$

17. $x = 1.7$

18. $x = 2.4$
    _____

19. Each box can hold 2.5 pounds of apples. How many pounds can 3 boxes hold?

    _____

20. Each pie costs $5.60. How much will it cost to buy 2 pies?

    _____

Holt McDougal Mathematics

LESSON	**Reading Strategies**
3-4	*Use a Visual Tool*

Each grid shows 0.15 shaded.
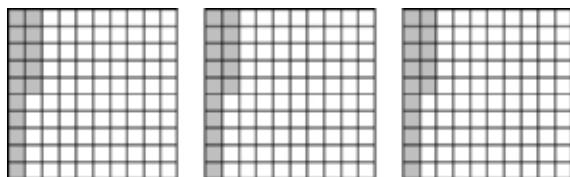
You can add the decimals to $\longrightarrow$ $0.15 + 0.15 + 0.15 = 0.45$
find how much of the grids
are shaded.

You can multiply 0.15 by 3. $\longrightarrow$

$$
\begin{array}{r}
\overset{1}{0.15} \\
\times \ \ 3 \\
\hline
0.45
\end{array}
$$

Use these grids to complete the problems below.
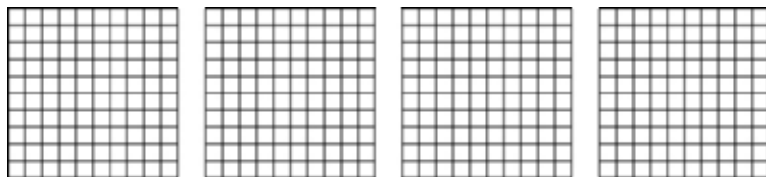
1. Shade 0.23 in each of the 4 grids.

2. Write an addition problem for the shaded grids.

   _____

3. Find the sum of your addition problem.

   _____

4. Write a multiplication problem for your shaded picture.

   _____

5. Find the product of your multiplication problem.

   _____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Review for Mastery
Multiplying Decimals

You can use a model to help you multiply a decimal by a whole number.

Find the product of 0.12 and 4, using a 10 by 10 grid.
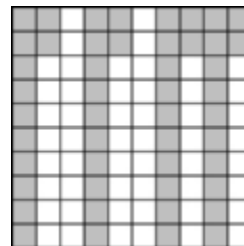
Shade 4 groups of 12 squares. Count the number of shaded squares. Since you have shaded 48 of the 100 squares,
$0.12 \cdot 4 = 0.48$.

Find each product.

1. $0.23 \cdot 3$ 2. $0.41 \cdot 2$ 3. $0.011 \cdot 5$ 4. $0.32 \cdot 2$

_____   _____   _____   _____

5. $0.15 \cdot 3$ 6. $0.42 \cdot 2$ 7. $0.04 \cdot 8$ 8. $0.22 \cdot 4$

_____   _____   _____   _____

You can also use a model to help you multiply a decimal by a decimal.

Find the product of 0.4 and 0.6.

$0.4 \cdot 0.6 = 0.24$
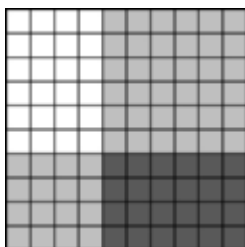
Find each product.

9. $0.2 \cdot 0.8$ 10. $0.7 \cdot 0.9$ 11. $0.5 \cdot 0.5$ 12. $0.3 \cdot 0.6$

_____   _____   _____   _____

13. $0.5 \cdot 0.2$ 14. $0.4 \cdot 0.4$ 15. $0.1 \cdot 0.9$ 16. $0.4 \cdot 0.7$

_____   _____   _____   _____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Student Worksheet
Multiplying Decimals

Problem 1

0.2 × 0.6
Where does the decimal point go?

0.**2** (1 decimal place)
0.**6** (1 decimal place)

Multiplying Machine

0.**12** (2 decimal places)
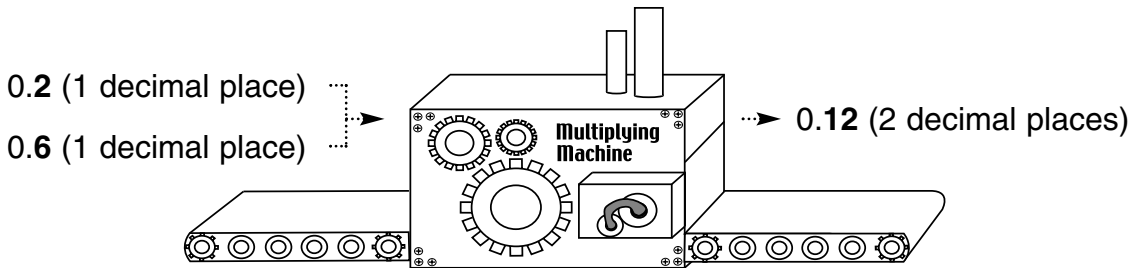
2 decimal places in   0.2 × 0.6   **2 decimal places out**

Problem 2

0.05 × 0.9
Where does the decimal point go?

0.**05** (2 decimal places)
0.**9** (1 decimal place)

Multiplying Machine

0.**045** (3 decimal places)
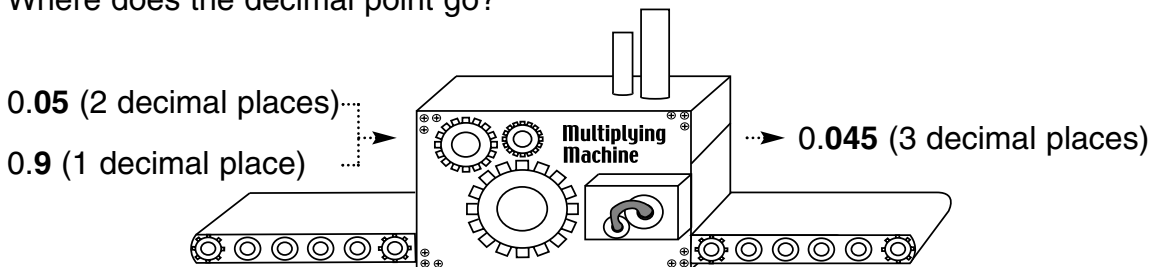
3 decimal places in   0.05 × 0.9   **3 decimal places out**

Think and Discuss

1. If Problem 1 was 0.20 × 0.60, where would you place the
decimal point? Explain.

_____

_____

2. How do you know that the decimal point in Problem 2 is placed
correctly?

_____

_____

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LESSON 3-5

Practice A

Dividing Decimals by Whole Numbers

Find each quotient.

1. $2.8 \div 4$

_____

2. $1.8 \div 2$

_____

3. $3.6 \div 6$

_____

4. $7.2 \div 9$

_____

5. $0.15 \div 3$

_____

6. $4.8 \div 8$

_____

7. $0.8 \div 4$

_____

8. $2.1 \div 7$

_____

9. $0.32 \div 4$

_____

10. $5.4 \div 9$

_____

11. $3.5 \div 5$

_____

12. $0.2 \div 2$

_____

Evaluate $2.4 \div x$ for each given value of x.

13. $x = 8$

_____

14. $x = 2$

_____

15. $x = 3$

_____

16. $x = 4$

_____

17. $x = 6$

_____

18. $x = 12$

_____

19. A six-pack of orange soda costs $4.20. How much does each can in the pack cost?

_____

20. It rained 2.7 inches in July and 2.1 inches in August. What was the average rainfall for those two months?

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Reading Strategies
Use a Visual Tool

You can use a hundred grid to show division with decimals.

The grid shows 0.15.　　⟶
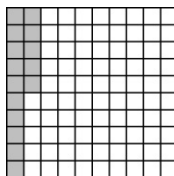
0.15 ÷ 3 means "separate
0.15 into 3 equal groups."　　⟶
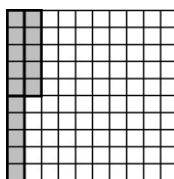
0.15 ÷ 3 makes 3 equal
groups of 0.05.　　⟶
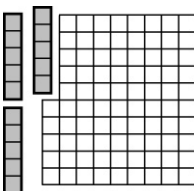
0.15 ÷ 3 = 0.05
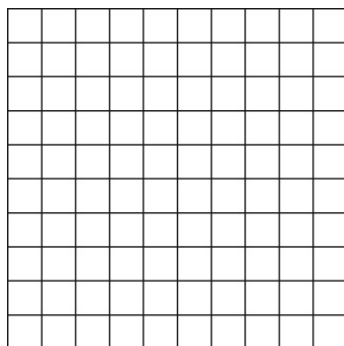
Use the grid to complete Exercises 1–4.

1. Shade 0.60 of the grid.

2. Divide the grid into 3 equal groups.

3. Write the decimal amount in each of the 3 groups. _____

4. Write a division problem for the picture you have created.

_____

Holt McDougal Mathematics

LESSON **3-5**

Review for Mastery

Dividing Decimals by Whole Numbers

You can use decimal grids to help you divide decimals by whole numbers.

To divide 0.35 by 7, first shade in a decimal grid to show thirty-five hundredths.
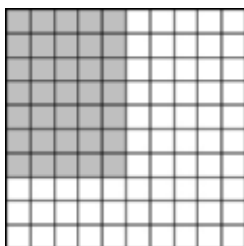
0.35 ÷ 7 means "divide 0.35 into 7 equal groups." Show this on the decimal grid.
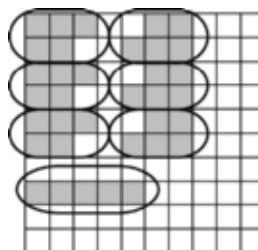
The number of units in each group is the quotient.

So, 0.35 ÷ 7 = 0.05.

Use decimal grids to find each quotient.

1. 0.24 ÷ 4

_____
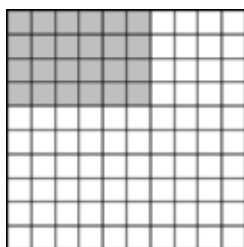
2. 0.48 ÷ 12

_____
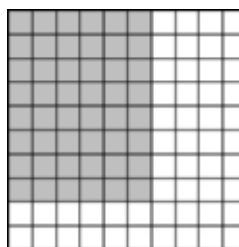
3. 0.50 ÷ 10

_____
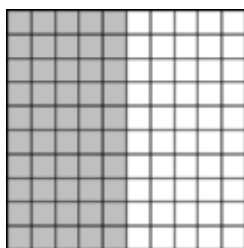
4. 0.98 ÷ 7

_____

5. 0.6 ÷ 5

_____

6. 0.78 ÷ 6

_____

7. 0.99 ÷ 11

_____

8. 0.32 ÷ 4

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____
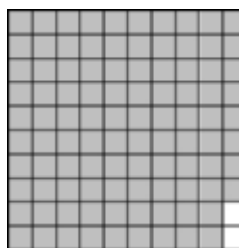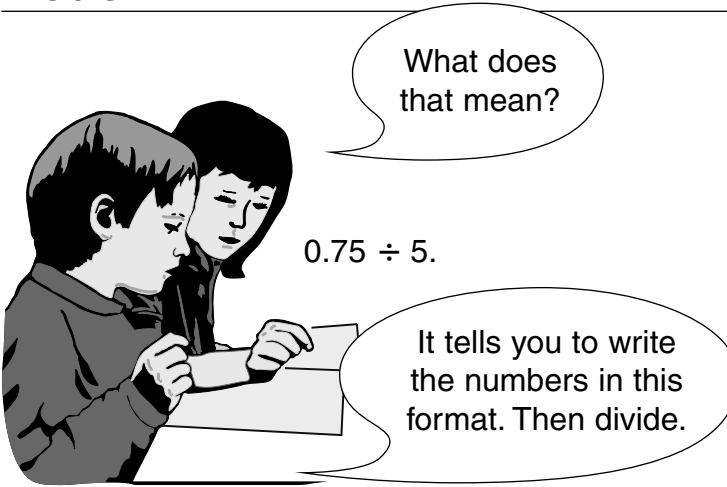
Student Worksheet
Dividing Decimals by Whole Numbers
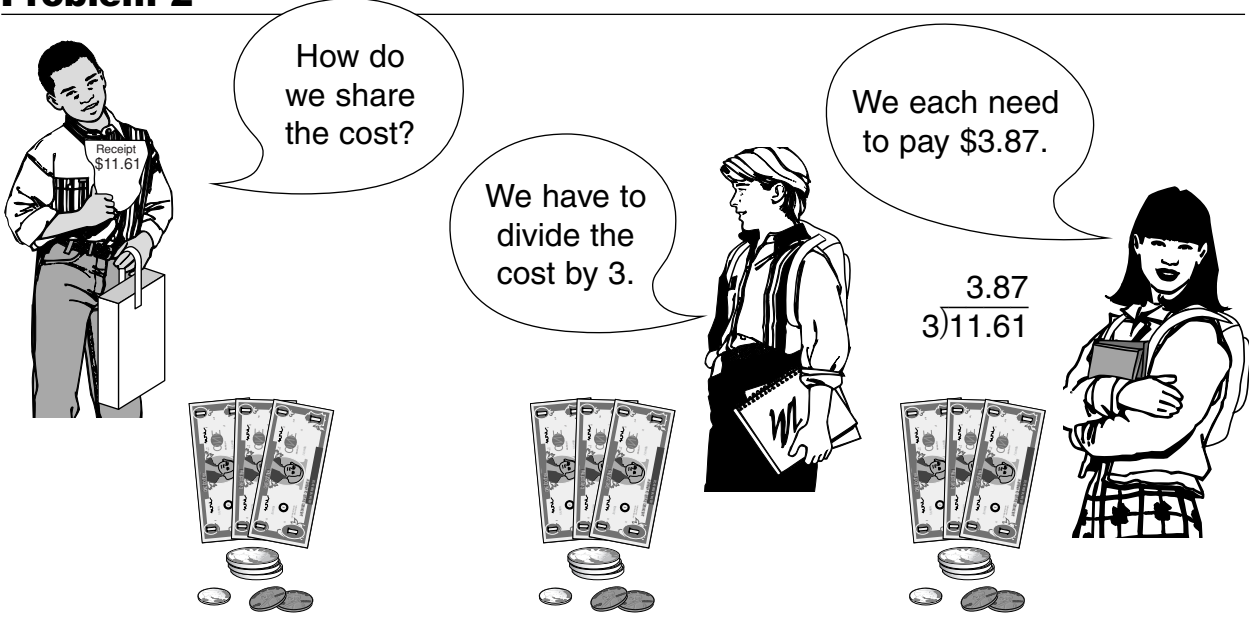
Problem 1

What does that mean?

$0.75 \div 5$.

It tells you to write the numbers in this format. Then divide.

$5\overline{)0.75}$ ⟹ $5\overline{)0.75}$ with quotient 0.15

Problem 2

How do we share the cost?

Receipt $11.61

We have to divide the cost by 3.

We each need to pay $3.87.

$3\overline{)11.61}$ with quotient 3.87

Think and Discuss

1. How do you know where to place the decimal point in the quotient in Problem 1?

_____

2. How can you determine if your answer to Problem 2 is correct?

_____

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Holt McDougal Mathematics

Practice A
Dividing by Decimals

Find each quotient.

1. $2.4 \div 0.4$

2. $1.4 \div 0.2$

3. $4.8 \div 0.6$

_____ _____ _____

4. $8.1 \div 0.9$

5. $1.8 \div 0.3$

6. $6.4 \div 0.8$

_____ _____ _____

7. $3.3 \div 0.3$

8. $2.6 \div 1.3$

9. $7.2 \div 1.2$

_____ _____ _____

10. $7.5 \div 1.5$

11. $6.0 \div 0.5$

12. $9.9 \div 1.1$

_____ _____ _____

Evaluate $4.8 \div x$ for each value of x.

13. $x = 0.2$

14. $x = 0.4$

15. $x = 0.3$

_____ _____ _____

16. $x = 0.6$

17. $x = 0.8$

18. $x = 1.2$

_____ _____ _____

19. Antonio spent $5.60 on cashews. They cost $1.40 per pound. How many pounds of cashews did Antonio buy?

20. Over several months, a scientist measured a total of 6.3 inches of snow. The average snowfall each month was 2.1 inches. How many months did the scientist measure the snow?

_____ _____

LESSON 3-6	**Reading Strategies**
	Make Predictions

Study the examples below. Look for patterns in the divisor and quotient.

Dividend		**Divisor**		**Quotient**
400	÷	20	=	20
400	÷	2	=	200
400	÷	0.2	=	2,000
400	÷	0.02	=	20,000

As the divisor is divided by 10, the quotient is multiplied by 10.

Use the information above to answer Exercises 1–3.

1. Predict the divisor for the next problem in this pattern.

   _____

2. Predict the quotient for the next problem in this pattern.

   _____

3. Write the next division problem and quotient for this pattern.

   _____

Study the pattern created by these division problems. Use the pattern to answer Exercises 4–6.

Dividend		**Divisor**		**Quotient**
900	÷	30	=	30
900	÷	3	=	300
900	÷	0.3	=	3,000

4. Predict the next divisor in this pattern.

   _____

5. Predict the next quotient in this pattern.

   _____

6. Write the division problem and quotient that you predict would come next.

   _____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Review for Mastery

Dividing by Decimals

You can use powers of ten to help you divide a decimal by a decimal.

To divide 0.048 by 0.12, first multiply each number by the least power of ten that makes the divisor a whole number.

$0.048 \div 0.12$

$0.12 \cdot 10^2 = 12$ Move the decimal point 2 places to the right.

$0.048 \cdot 10^2 = 4.8$ Move the decimal point 2 places to the right.

Then divide.

$4.8 \div 12$ **Step 1:** Divide as you would divide a whole number by a whole number.

$$\begin{array}{r} 0.4 \\ 12 \overline{)4.8} \\ \underline{4\ 8} \\ 0 \end{array}$$

Step 2: Think $48 \div 12 = 4$.

Step 3: Bring the decimal into the quotient and add a zero placeholder if necessary.

So, $0.048 \div 0.12 = 0.4$.

Find each quotient.

1. $0.7\overline{)0.42}$

2. $0.08\overline{)0.4}$

3. $0.5\overline{)0.125}$

4. $0.02\overline{)0.3}$

5. $0.4\overline{)0.08}$

6. $0.9\overline{)0.63}$

7. $0.008\overline{)0.4}$

8. $0.04\overline{)0.032}$

9. $0.3\overline{)0.06}$

10. $0.04\overline{)0.2}$

11. $0.007\overline{)4.9}$

12. $0.6\overline{)0.012}$

Holt McDougal Mathematics

Name _____ Date _____ Class _____

LESSON 3-6 **Student Worksheet**
Dividing by Decimals

Problem 1

Find 3.6 ÷ 1.2.

$$1\,.\,2\,\overline{)\,3\,.\,6} \qquad \rightarrow \qquad 12\,\overline{)\,36}$$

Divisor   Dividend
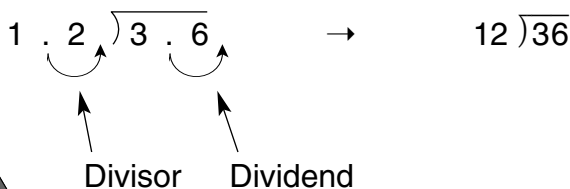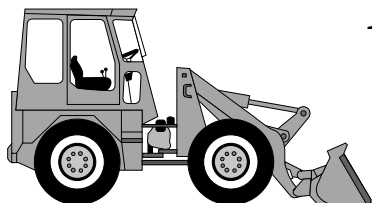
There is 1 decimal place in the divisor, so multiply by 10^1, or 10.
That means to move the decimal 1 place to the right.

Problem 2

100 miles   368.5 miles

0 miles

200 miles

13.4 gallons
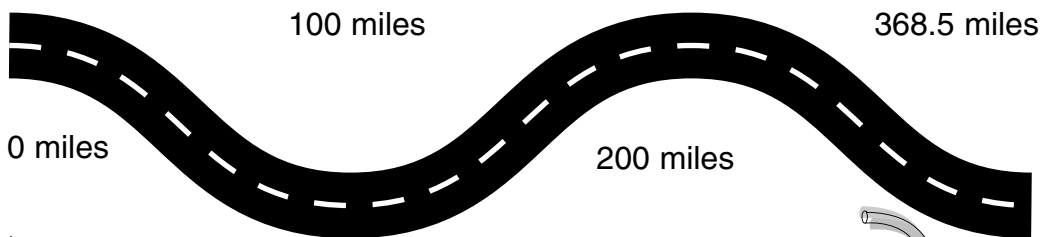
$$\text{miles per gallon} = \frac{\text{miles}}{\text{gallon}} = \text{gallons}\overline{)\,\text{miles}}$$

$$13.4\,\overline{)\,368.5} \quad \rightarrow \quad 134\,\overline{)\,3685.0} \quad \rightarrow \quad 134\,\overline{)\,3685.0}^{\,27.5}$$
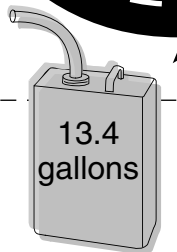
Think and Discuss

1. Does the quotient in Problem 1 have a remainder? How do you
know?

2. How do you check the answer to a division problem?

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Exercises

GUIDED PRACTICE

See Example 1   Find each quotient.

1. $6.5 \div 1.3$ **2.** $20.7 \div 0.6$ **3.** $25.5 \div 1.5$

4. $5.4 \div 0.9$ **5.** $13.2 \div 2.2$ **6.** $63.39 \div 0.24$

See Example 2   **7.** Marcus drove 354.9 miles in 6.5 hours. On average, how many miles per hour did he drive?

8. **Consumer Math** Anthony spends $87.75 on shrimp. The shrimp cost $9.75 per pound. How many pounds of shrimp does Anthony buy?

INDEPENDENT PRACTICE

See Example 1   Find each quotient.

9. $3.6 \div 0.6$ **10.** $8.2 \div 0.5$ **11.** $18.4 \div 2.3$

12. $4.8 \div 1.2$ **13.** $52.2 \div 0.24$ **14.** $32.5 \div 2.6$

15. $49.5 \div 4.5$ **16.** $96.6 \div 0.42$ **17.** $6.5 \div 1.3$

See Example 2   **18.** Jen spends $5.98 on ribbon. Ribbon costs $0.92 per meter. How many meters of ribbon does Jen buy?

19. Kyle's family drove 329.44 miles. Kyle calculated that the car averaged 28.4 miles per gallon of gas. How many gallons of gas did the car use?

20. **Consumer Math** Peter is saving $4.95 each week to buy a DVD that costs $24.75, including tax. For how many weeks will he have to save?

PRACTICE AND PROBLEM SOLVING

Divide.

21. $2.52 \div 0.4$ **22.** $12.586 \div 0.35$ **23.** $0.5733 \div 0.003$

24. $10.875 \div 1.2$ **25.** $92.37 \div 0.5$ **26.** $8.43 \div 0.12$

Evaluate.

27. $0.732 \div n$ for $n = 0.06$ **28.** $73.814 \div c$ for $c = 1.3$

29. $b \div 0.52$ for $b = 6.344$ **30.** $r \div 4.17$ for $r = 10.5918$

Find the value of each expression.

31. $6.35 \times 10^2 \div 0.5$ **32.** $8.1 \times 10^2 \div 0.9$ **33.** $4.5 \times 10^3 \div 4$

34. $20.1 \times 10^3 \div 0.1$ **35.** $2.76 \times 10^2 \div 0.3$ **36.** $6.2 \times 10^3 \div 8$

37. Find the value of $6.45 \times 10^6 \div 0.3$.

○ = WORKED-OUT SOLUTIONS
on p. WS4

The U.S. Mint was established by the Coinage Act in 1792. The first coins were copper and were made in Philadelphia.

38. Earth Science A planet's year is the time it takes that planet to revolve around the Sun. A Mars year is 1.88 Earth years. If you are 13 years old in Earth years, about how old would you be in Mars years?

39. History The U.S. Treasury first printed paper money in 1862. The paper money we use today is 0.0043 inch thick. Estimate the number of bills you would need to stack to make a pile that is 1 inch thick. If you stacked $20 bills, what would be the total value of the money in the pile?

Use the map for Exercises 40 and 41.

40. Multi-Step Bill drove from Washington, D.C., to Charlotte in 6.5 hours. What was his average speed in miles per hour?

41. Estimation Betty drove a truck from Richmond to Washington, D.C. It took her about 2.5 hours. Estimate the average speed she was driving.

42. What's the Error? A student incorrectly answered the division problem below. Explain the error and write the correct quotient.

$$0.004\overline{)53.824} = 13.456$$

43. Write About It Explain how you know where to place the decimal point in the quotient when you divide by a decimal number.

44. Challenge Find the value of a in the division problem.

$$4a3\overline{)0417.13} = 1.01$$

45. Multiple Choice Nick bought 2.5 pounds of popcorn for $8.35. How much did he pay for each pound of popcorn?

A. $20.88   **B.** $3.43   **C.** $3.34   **D.** $33.40

46. Extended Response In the 2006–2007 NBA season, Kevin Garnett earned a salary of $21,000,000. He played in 76 games and averaged 39.4 minutes per game. How much money did Kevin Garnett earn each minute he played? Round your answer to the nearest dollar. Explain how you solved the problem.

Translate each phrase into a numerical or algebraic expression. (Lesson 2-2)

47. 12 more than x **48.** the product of 8 and 12   **49.** a less than 15

Evaluate $4y$ for each value of y. (Lesson 3-4)

50. $y = 2.13$ **51.** $y = 4.015$ **52.** $y = 3.6$ **53.** $y = 0.78$ **54.** $y = 1.4$

LESSON 3-7

Practice A

Interpreting the Quotient

Circle the letter of the correct answer.

1. Hamburger rolls come in packs of 8. How many packs should you buy to have 60 rolls?

    A 8

    B 6

    C 5

    D 7

2. Each pack of hamburger rolls costs $1.50. How many packs can you buy with $8.00?

    F 6

    G 5

    H 4

    I 8

3. How many 0.6-pound hamburgers can you make with 7.8 pounds of ground beef?

    A 13

    B 14

    C 10

    D 16

4. You spend a total of $5.10 for 3 pounds of ground beef. How much does the ground beef cost per pound?

    F $0.70

    G $0.17

    H $15.30

    I $1.70

Write the correct answer.

5. Four friends equally shared the cost of buying supplies for the class picnic. The supplies cost a total of $12.40. How much did they each pay?

    _____

6. In all, 20 people are going to the picnic. Each van seats 6 people. How many vans are needed to take everyone to the picnic?

    _____

7. Plastic forks come in packs of 6. If you need 40 forks for the picnic, how many packs should you buy?

    _____

8. You spent a total of $9.60 on paper plates for the picnic. Each pack costs $1.20. How many packs of paper plates did you buy?

    _____

Holt McDougal Mathematics

LESSON
3-7
Reading Strategies
Use Context

How the decimal portion of the quotient in a division problem is used depends upon the situation.

Situation 1   74 students are going on a field trip in cars. Each car can carry 5 students. How many cars are needed?

Divide 74 by 5. $\longrightarrow$ $74 \div 5 = 14.8$ cars

Reasoning   14 cars will not be enough for all students. You need 15 cars. The quotient 14.8 needs to be rounded up to 15 in this situation.

Situation 2   How many 8 oz servings are in a 44 oz can of juice?

Divide 44 by 8. $\longrightarrow$ $44 \div 8 = 5.5$ servings

Reasoning   There are 5 full 8 oz servings in the can. The 0.5 serving is not 8 ounces. The quotient 5.5 is rounded down to 5 in this situation.

Situation 3   4 boys mowed a lawn for $35. How much money should each boy receive to share the money equally?

Divide $35 by 4. $\longrightarrow$ $\$35 \div 4 = \$8.75$

Reasoning   The exact quotient of $8.75 states what each boy should receive. The exact quotient of $8.75 makes sense.

Tell whether you would round the quotient up, round the quotient down, or leave the exact quotient for each. Write to explain your choice.

1. You need 8 inches of ribbon to make a bow. How many bows can you make with 50 inches of ribbon? $50 \div 8 = 6.25$

_____

2. Each lunch table seats 10 children. There are 155 children in the cafeteria for each lunch period. How many tables are needed? $155 \div 10 = 15.5$

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Review for Mastery

Interpreting the Quotient

There are three ways the decimal part of a quotient can be interpreted when you solve a problem.

> **If the question asks for an exact number, use the entire quotient.**

> **If the question asks how many whole groups are needed to put all items of the dividend into a group, round the quotient up to the next whole number.**

> **If the question asks how many whole groups can be made, drop the part of the quotient to the right of the decimal point.**

To interpret the quotient, decide what the question is asking.

In the school library, there are tables that seat 4 students each. If there are 30 students in a class, how many tables are needed to seat all of the students?

To solve, divide 30 by 4.

$30 \div 4 = 7.5$

The question is asking how many tables (whole groups) are needed to put all of the students in the class (dividend) into a group.

So, round 7.5 up to the next whole number.

8 tables are needed to seat all of the students.

Interpret the quotient to solve each problem.

1. A recipe that serves 6 requires 9 cups of milk. How much milk is needed for each serving?

   _____

2. A storage case holds 24 model cars. Marla has 84 model cars. How many storage cases does she need to store all of her cars?

   _____

3. Kenny has $4.25 to spend at the school carnival. If game tickets are $0.50 each, how many games can Kenny play?

   _____

Holt McDougal Mathematics

LESSON 3-7 **Student Worksheet**
Interpreting the Quotient

Problem 1

How many rolls of film do I need?

Number of students		Number of exposures on each roll		Number of rolls of film
246	÷	24	=	10.25

$$
\begin{array}{r}
10.25 \\
24\overline{)246.0} \\
-24 \\
\hline
060 \\
-48 \\
\hline
120
\end{array}
$$

I cannot buy part of a roll, so I will have to round up to 11.

Think and Discuss

1. If the teacher only bought 10 rolls of film, what would happen?

_____

2. Why can't the teacher use the exact quotient as her answer?

_____

_____

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LESSON
4-9

Practice A

Estimating Fraction Sums and Differences

Round each number to 0, $\frac{1}{2}$, or 1.

1. $\frac{1}{6}$ _____

2. $\frac{3}{7}$ _____

3. $\frac{7}{8}$ _____

4. $\frac{2}{5}$ _____

5. $\frac{9}{10}$ _____

6. $\frac{2}{15}$ _____

Estimate each sum or difference by rounding to 0, $\frac{1}{2}$, or 1.

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

8. $\frac{5}{6} - \frac{3}{5}$

9. $\frac{4}{9} + \frac{1}{8}$

_____   _____   _____

10. $\frac{8}{9} - \frac{6}{7}$

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

12. $\frac{3}{4} - \frac{2}{3}$

_____   _____   _____

13. $\frac{4}{7} + \frac{3}{5}$

14. $\frac{1}{5} + \frac{4}{9}$

15. $\frac{3}{4} - \frac{4}{7}$

_____   _____   _____

Use the table for Exercises 16 and 17.

16. About how far did Mia swim during week 1 and week 2 altogether?

_____

17. About how much farther did Mia swim during week 3 than during week 1?

_____

Mia's Swimming Distances

Week	Distance (mi)
1	$1\frac{1}{4}$
2	$\frac{2}{3}$
3	$1\frac{5}{6}$

18. Shelley used $\frac{3}{5}$ ounce of water in her experiment. Ali used $\frac{7}{9}$ ounce of water in his experiment. Who used more water and about how much more water was used?

_____

19. Fred ran $1\frac{6}{11}$ of a mile, and then he walked $1\frac{5}{8}$ of a mile. About how many miles did Fred cover in all?

_____

Holt McDougal Mathematics

LESSON **Reading Strategies**

4-9 *Use a Graphic Aid*

When you don't need exact values of fractions, you can use a
number line to help you estimate the values by rounding.

Fractions Close to 1

The number line shows that the fractions $\frac{5}{6}$ and $\frac{7}{8}$ are both

close to 1. When the numerator and denominator of a fraction are
close to the same value, round to 1.
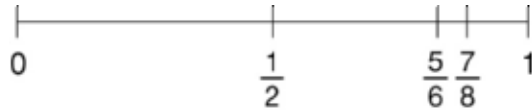
Fractions Close to $\frac{1}{2}$

The number line shows fractions such as $\frac{6}{13}$, $\frac{9}{20}$, and $\frac{12}{23}$ that are close to $\frac{1}{2}$.

When the numerator is about half the value of the denominator, round to $\frac{1}{2}$.
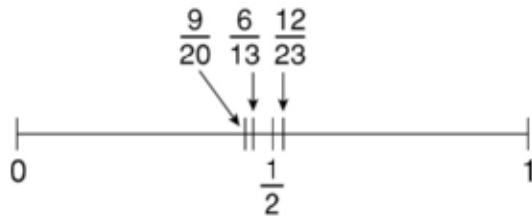
Fractions Close to 0

The number line shows fractions such as $\frac{1}{15}$, $\frac{6}{50}$, and $\frac{2}{25}$ that are close

to 0. When the numerator is much less than the denominator, round to 0.

Estimate the value of each fraction. Write *close to 0, close to $\frac{1}{2}$, or *close to 1*.

1. $\frac{12}{25}$ _____

2. $\frac{1}{17}$ _____

3. $\frac{8}{9}$ _____

4. $\frac{9}{10}$ _____

Holt McDougal Mathematics

LESSON 4-9

Review for Mastery

Estimating Fraction Sums and Differences

You can use number lines to help you estimate fraction sums and differences.

To estimate the sum of $\frac{5}{6}$ and $\frac{1}{3}$, locate each fraction on a number line. Then round each fraction to 0, $\frac{1}{2}$, or 1.

To estimate the difference between $\frac{7}{8}$ and $\frac{2}{4}$, locate each fraction on a number line. Then round each fraction to 0, $\frac{1}{2}$, or 1.
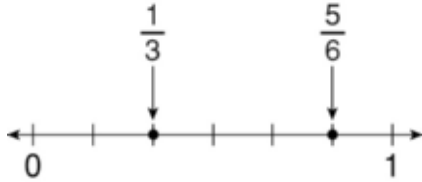
$\frac{5}{6} + \frac{1}{3} \approx$

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

So, $\frac{5}{6} + \frac{1}{3}$ is about $1\frac{1}{2}$.
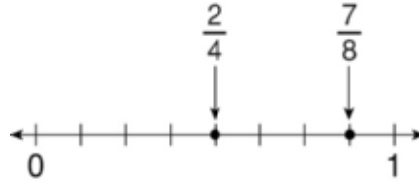
$\frac{7}{8} - \frac{2}{4} \approx$

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

So, $\frac{7}{8} - \frac{2}{4}$ is about $\frac{1}{2}$.

Use the number line to round each fraction to 0, $\frac{1}{2}$, or 1 to estimate each sum or difference.
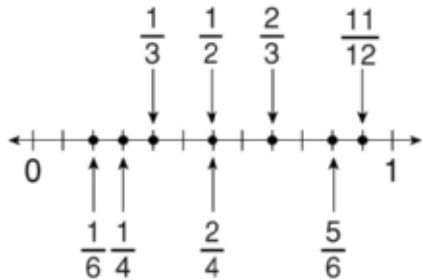
1. $\frac{5}{6} + \frac{1}{6}$

2. $\frac{11}{12} - \frac{1}{2}$

_____

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

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

_____

Use the number line to round each fraction to 0, $\frac{1}{2}$, or 1 to estimate each sum or difference.
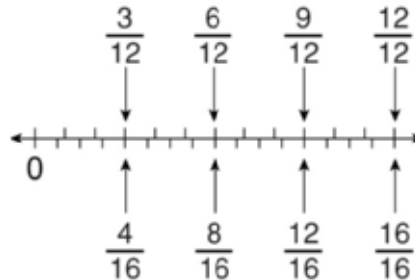
5. $\frac{7}{12} + \frac{2}{6}$

6. $\frac{5}{6} - \frac{3}{8}$

_____

7. $\frac{1}{4} + \frac{2}{6}$

8. $\frac{7}{8} + \frac{14}{16}$

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Student Worksheet

4-9 *Estimating Fraction Sums and Differences*

Problem 1

Estimate the sum or difference.

A.
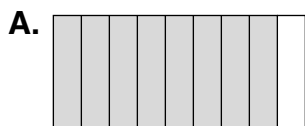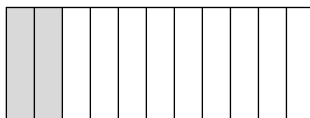
$$\frac{8}{9} \qquad + \qquad \frac{2}{11}$$

$$1 \qquad + \qquad 0 \qquad = \qquad 1$$

$$\frac{8}{9} \quad + \quad \frac{2}{11} \qquad \text{is } \textbf{about } 1$$

B.
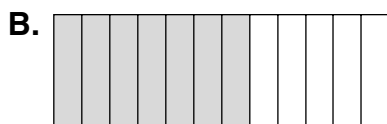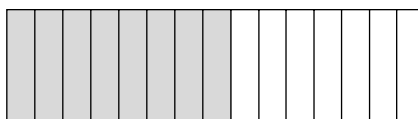
$$\frac{7}{12} \qquad - \qquad \frac{8}{15}$$

$$\frac{1}{2} \qquad - \qquad \frac{1}{2} \qquad = \qquad 0$$

$$\frac{7}{12} \quad - \quad \frac{8}{15} \qquad \text{is } \textbf{about } 0$$

Think and Discuss

1. Explain how to round a fraction to 0, $\frac{1}{2}$, or 1.

_____

_____

2. In Problem 1, why does the answer say that the sum is *about* 1?

_____

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Holt McDougal Mathematics

Practice A
Multiplying Fractions by Whole Numbers

Multiply. Write each answer in simplest form.

1. $1 \cdot \frac{1}{3}$

2. $3 \cdot \frac{1}{8}$

3. $7 \cdot \frac{1}{9}$

_____

4. $3 \cdot \frac{1}{4}$

5. $4 \cdot \frac{2}{10}$

6. $3 \cdot \frac{1}{6}$

_____

7. $2 \cdot \frac{2}{5}$

8. $10 \cdot \frac{1}{2}$

9. $5 \cdot \frac{1}{8}$

_____

10. $4 \cdot \frac{1}{6}$

11. $7 \cdot \frac{1}{8}$

12. $3 \cdot \frac{2}{6}$

_____

13. $7 \cdot \frac{1}{11}$

14. $3 \cdot \frac{1}{9}$

15. $5 \cdot \frac{1}{15}$

_____

Evaluate 2x for each value of x. Write the answer in simplest form.

16. $x = \frac{1}{4}$

17. $x = \frac{1}{3}$

18. $x = \frac{1}{2}$

19. $x = \frac{1}{6}$

_____

20. $x = \frac{1}{7}$

21. $x = \frac{1}{8}$

22. $x = \frac{2}{3}$

23. $x = \frac{3}{4}$

_____

24. Richie is making 3 quarts of fruit punch for his friends. He must add $\frac{1}{2}$ cup sugar to make each quart of punch. How much sugar will he add?

25. Mrs. Flynn has 20 students in her class. One-fourth of her students purchased lunch tokens. How many of her students purchased tokens?

_____

Name _____ Date _____ Class _____

Reading Strategies
Relate Words and Symbols

Repeated addition is a way to represent multiplication of fractions.
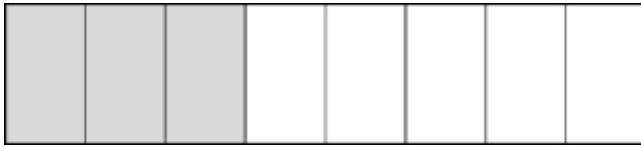
$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{8}$ ⟶ Repeated addition

three times one-eight = three-eighths ⟶ Words

$3 \cdot \frac{1}{8} = \frac{3}{8}$ ⟶ Symbols
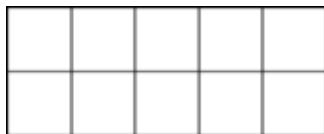
Answer the following questions.

1. What is $\frac{2}{8} \cdot 2$? _____

2. What is three-eighths times two? _____

3. What is $\frac{1}{8} \cdot 4$? _____

4. Write $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ as a multiplication problem. _____

Use the rectangle to answer each question.

5. What is two-tenths times two? _____

6. What is $\frac{1}{10} \cdot 4$? _____

7. What is four-tenths times two? _____

8. Write $\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$ as a multiplication problem in words.

_____

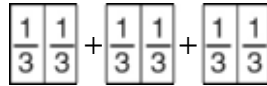Holt McDougal Mathematics

LESSON
5-5

Review for Mastery

Multiplying Fractions by Whole Numbers

You can use fraction strips to multiply fractions by whole numbers.

To find $3 \cdot \frac{2}{3}$, first think about the expression in words.

$3 \cdot \frac{2}{3}$ means "3 groups of $\frac{2}{3}$."

Then model the expression.

$$\boxed{\frac{1}{3} \; \frac{1}{3}} + \boxed{\frac{1}{3} \; \frac{1}{3}} + \boxed{\frac{1}{3} \; \frac{1}{3}}$$

The total number of $\frac{1}{3}$ fraction pieces is 6.

So, $3 \cdot \frac{2}{3} = \frac{2}{3} + \frac{2}{3} + \frac{2}{3} =$

$\frac{6}{3} = 2$ in simplest form.

Use fraction strips to find each product.

1. $4 \cdot \frac{1}{8}$

2. $2 \cdot \frac{2}{5}$

3. $6 \cdot \frac{1}{8}$

4. $8 \cdot \frac{1}{4}$

_____ _____ _____ _____

You can also use counters to multiply fractions by whole numbers.

To find $\frac{1}{2} \cdot 12$, first think about the expression in words.

$\frac{1}{2} \cdot 12 = \frac{12}{2}$, which means "12 divided into 2 equal groups."

Then model the expression.

$$(○ ○ ○ ○ ○ ○)(○ ○ ○ ○ ○ ○)$$

The number of counters in each group is the product.

$\frac{1}{2} \cdot 12 = 6$.

Use counters to find each product.

5. $\frac{1}{3} \cdot 15$

6. $\frac{1}{8} \cdot 24$
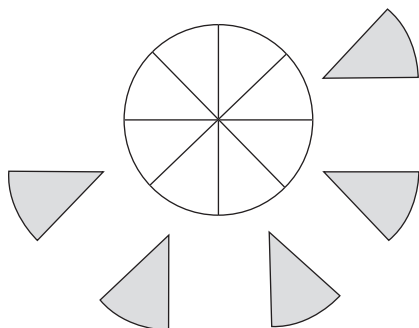
7. $\frac{1}{4} \cdot 16$

8. $\frac{1}{12} \cdot 24$

_____ _____ _____ _____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Student Worksheet
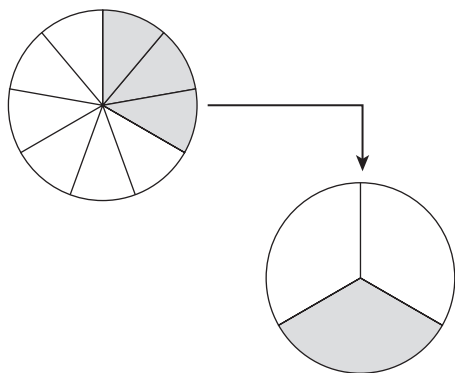## *Multiplying Fractions by Whole Numbers*

Problem 1

How do you multiply fractions and whole numbers?

Remember:
$5 = \dfrac{5}{1}$

$$\frac{5}{1} \cdot \frac{1}{8} = \frac{5}{8}$$

Problem 2

$$\frac{3}{1} \cdot \frac{1}{9} = \frac{3}{9}$$

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

Think and Discuss

1. What is the first step in multiplying a whole number by a fraction?

_____

2. How does multiplying fractions differ from adding fractions?

_____

_____

_____

MA.6.A.1.2, MA.6.A.1.3

GUIDED PRACTICE

See Example **1** Multiply. Write each answer in simplest form.

1. $8 \cdot \frac{1}{9}$　　2. $2 \cdot \frac{1}{5}$　　3. $12 \cdot \frac{1}{4}$　　4. $7 \cdot \frac{4}{9}$

5. $3 \cdot \frac{1}{7}$　　6. $4 \cdot \frac{2}{11}$　　7. $8 \cdot \frac{3}{4}$　　8. $18 \cdot \frac{1}{3}$

See Example **2** Evaluate $12x$ for each value of x. Write each answer in simplest form.

9. $x = \frac{2}{3}$　　10. $x = \frac{1}{2}$　　11. $x = \frac{3}{4}$　　12. $x = \frac{5}{6}$

See Example **3** 13. The school Community Service Club has 45 members. Of these 45 members, $\frac{3}{5}$ are boys. How many boys are members of the Community Service Club?

INDEPENDENT PRACTICE

See Example **1** Multiply. Write each answer in simplest form.

14. $4 \cdot \frac{1}{10}$　　15. $6 \cdot \frac{1}{8}$　　16. $3 \cdot \frac{1}{12}$　　17. $2 \cdot \frac{2}{5}$

18. $6 \cdot \frac{10}{11}$　　19. $2 \cdot \frac{3}{11}$　　20. $15 \cdot \frac{2}{15}$　　21. $20 \cdot \frac{1}{2}$

See Example **2** Evaluate $8x$ for each value of x. Write each answer in simplest form.

22. $x = \frac{1}{2}$　　23. $x = \frac{3}{4}$　　24. $x = \frac{1}{8}$　　25. $x = \frac{1}{4}$

26. $x = \frac{2}{5}$　　27. $x = \frac{6}{7}$　　28. $x = \frac{7}{8}$　　29. $x = \frac{4}{9}$

See Example **3** 30. **School** Kiesha spent 120 minutes completing her homework last night. Of those minutes, $\frac{1}{6}$ were spent on Spanish. How many minutes did Kiesha spend on her Spanish homework?

PRACTICE AND PROBLEM SOLVING

Evaluate each expression. Write each answer in simplest form.

31. $12b$ for $b = \frac{7}{12}$　　32. $20m$ for $m = \frac{1}{20}$　　33. $33z$ for $z = \frac{5}{11}$

34. $\frac{2}{3}y$ for $y = 18$　　35. $\frac{1}{4}x$ for $x = 20$　　36. $\frac{3}{5}a$ for $a = 30$

37. $\frac{4}{5}c$ for $c = 12$　　38. $14x$ for $x = \frac{3}{8}$　　39. $\frac{9}{10}n$ for $n = 50$

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

40. $9 \cdot \frac{1}{16}$ ▢ $\frac{1}{2}$　　41. $15 \cdot \frac{2}{5}$ ▢ 5　　42. $\frac{8}{13}$ ▢ $4 \cdot \frac{2}{13}$

43. $3 \cdot \frac{2}{9}$ ▢ $\frac{2}{3}$　　44. $6 \cdot \frac{4}{15}$ ▢ $\frac{11}{24}$　　45. 5 ▢ $12 \cdot \frac{3}{4}$

46. $3 \cdot \frac{1}{7}$ ▢ $3 \cdot \frac{1}{5}$　　47. $7 \cdot \frac{3}{4}$ ▢ $6 \cdot \frac{3}{7}$　　48. $2 \cdot \frac{5}{6}$ ▢ $6 \cdot \frac{2}{5}$

49. Denise spent $55 shopping. Of that $55, she spent $\frac{3}{5}$ on a pair of shoes. How much money did Denise spend on the pair of shoes?

O = **WORKED-OUT SOLUTIONS** on p. WS6

The General Sherman, a giant sequoia tree in California's Sequoia National Park, is one of the largest trees in the world at 275 ft tall.

California also has some of the nation's tallest grand firs, ponderosa pines, and sugar pines. The table shows how the heights of these trees compare with the height of the General Sherman. For example, the grand fir is $\frac{23}{25}$ the height of the General Sherman.

50. Find the heights of the trees in the table. Write your answers in simplest form.

51. The world's tallest bluegum eucalyptus tree is $\frac{3}{5}$ the height of the General Sherman tree. How tall is this bluegum eucalyptus?

52. ❓ **What's the Question?** Joshua trees can grow to be 40 ft tall. The answer is $\frac{8}{55}$. What is the question?

53. 🍃 **Write About It** Find $\frac{1}{5}$ the height of the General Sherman. Then divide the height of the General Sherman by 5. What do you notice? Why does this make sense?

54. ⭐ **Challenge** The world's tallest incense cedar tree is 152 ft tall. What is $\frac{1}{5}$ of $\frac{1}{2}$ of $\frac{1}{4}$ of 152?

Tree Heights Compared with the General Sherman	
Tallest Grand Fir	$\frac{23}{25}$
Tallest Ponderosa Pine	$\frac{41}{50}$
Tallest Sugar Pine	$\frac{21}{25}$

Source: The Top 10 of Everything 2000

Florida Spiral Review 　　　　　　　　MA.6.A.1.2, MA.6.A.1.3, MA.6.A.3.1

55. **Multiple Choice** A recipe uses $\frac{1}{3}$ cup of sugar. Daniela doubled the recipe. How much sugar did she use?

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

56. **Extended Response** Mario bought $\frac{1}{5}$ pound of turkey. Rose bought four times as much turkey as Mario. And Celia bought 2 times as much as Rose. How many pounds of turkey did Rose buy? How many pounds did Celia buy? How much more did Celia buy than Mario? Show your work.

Write each phrase as a numerical or algebraic expression. (Lesson 2-3)

57. w less than 75 　　　58. the product of n and 16 　　　59. the quotient of p and 7

60. Jennifer has 50 oz of formula to make bottles for her twin babies. Each bottle needs to have 6.5 oz of formula. How many bottles can Jennifer make? (Lesson 3-7)

LESSON 5-6

Practice A

Multiplying Fractions

Multiply. Write each answer in simplest form.

1. $\dfrac{1}{2} \cdot \dfrac{1}{7}$

2. $\dfrac{1}{4} \cdot \dfrac{1}{4}$

3. $\dfrac{1}{5} \cdot \dfrac{1}{3}$

_____

4. $\dfrac{2}{3} \cdot \dfrac{1}{3}$

5. $\dfrac{2}{3} \cdot \dfrac{2}{7}$

6. $\dfrac{1}{4} \cdot \dfrac{1}{5}$

_____

7. $\dfrac{1}{3} \cdot \dfrac{2}{5}$

8. $\dfrac{1}{4} \cdot \dfrac{2}{3}$

9. $\dfrac{1}{3} \cdot \dfrac{1}{3}$

_____

Evaluate the expression $x \cdot \dfrac{1}{2}$ for each value of x. Write the answer in simplest form.

10. $x = \dfrac{1}{2}$

11. $x = \dfrac{1}{3}$

12. $x = \dfrac{1}{4}$

_____

13. $x = \dfrac{1}{5}$

14. $x = \dfrac{2}{3}$

15. $x = \dfrac{3}{4}$

_____

16. In Mr. Sanders class, $\dfrac{1}{3}$ of the students are girls. About $\dfrac{1}{4}$ of the girls want to join the chorus. What fraction of all the students in Mr. Sanders's class want to join the chorus?

_____

17. A recipe for trail mix calls for $\dfrac{3}{4}$ pound of peanuts. Luiza only wants to make half of the recipe's servings. How many pounds of peanuts should she use?
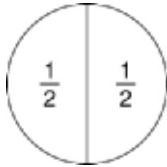
_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____
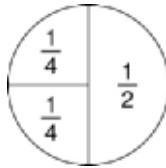
Reading Strategies
Use Graphic Aids

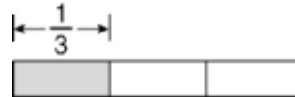The circle below is divided into two equal parts. Each part is equal to one-half.

If one-half of the circle is split in half, it looks like this.

$\frac{1}{2}$ of $\frac{1}{2}$ is $\frac{1}{4}$

$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

The drawing shows a rectangle divided into thirds.

1. If you divide $\frac{1}{3}$ of the rectangle in half, what fractional part will that be? _____

2. One-half of $\frac{1}{3}$ = _____

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

To multiply fractions:

$\frac{2}{3} \cdot \frac{1}{4}$

$\frac{2 \cdot 1}{3 \cdot 4} = \frac{2}{12}$ ⟵ Multiply numerators.
⟵ Multiply denominators.

$\frac{2}{12} = \frac{1}{6}$ ⟵ Answer in simplest form

Use the problem $\frac{2}{5} \cdot \frac{3}{4}$ to answer the following questions.

4. When you multiply the numerators, the product is _____.

5. When you multiply the denominators, the product is _____.

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

Holt McDougal Mathematics

LESSON 5-6

Review for Mastery
Multiplying Fractions

To multiply fractions, multiply the numerators and multiply the denominators.

When multiplying fractions, you can sometimes divide by the GCF to make the problem simpler.

You can divide by the GCF even if the numerator and denominator of the same fraction have a common factor.

$$\frac{1}{2} \cdot \frac{2}{3}$$

$$\frac{1}{\cancel{2}} \cdot \frac{\cancel{2}}{3}$$

The problem is now $\frac{1}{1} \cdot \frac{1}{3}$.

$$\frac{1 \cdot 1}{1 \cdot 3} = \frac{1}{3}$$

So, $\frac{1}{2} \cdot \frac{2}{3} = \frac{1}{3}$

Is it possible to simplify before you multiply? If so, what is the GCF?

1. $\frac{1}{4} \cdot \frac{1}{2}$

2. $\frac{1}{6} \cdot \frac{3}{4}$

3. $\frac{1}{8} \cdot \frac{2}{3}$

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

_____   _____   _____   _____

Multiply.

5. $\frac{1}{6} \cdot \frac{3}{5}$

6. $\frac{1}{4} \cdot \frac{1}{3}$

7. $\frac{7}{8} \cdot \frac{4}{5}$

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

_____   _____   _____   _____

9. $\frac{1}{5} \cdot \frac{1}{2}$

10. $\frac{3}{5} \cdot \frac{1}{4}$

11. $\frac{3}{7} \cdot \frac{1}{9}$

12. $\frac{3}{4} \cdot \frac{1}{2}$

_____   _____   _____   _____

13. $\frac{1}{3} \cdot \frac{6}{7}$

14. $\frac{1}{4} \cdot \frac{2}{3}$

15. $\frac{3}{4} \cdot \frac{1}{3}$

16. $\frac{1}{4} \cdot \frac{1}{8}$

_____   _____   _____   _____

Holt McDougal Mathematics

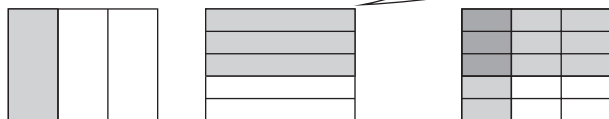**LESSON** **5-6** **Student Worksheet**
Multiplying Fractions

Problem 1

$\frac{1}{3} \cdot \frac{3}{5}$

How do I multiply fractions?

$\frac{1}{3}$ · $\frac{3}{5}$ = $\frac{1 \cdot 3}{3 \cdot 5}$

Multiply numerators and denominators.

$\frac{1 \cdot 3}{3 \cdot 5}$ = $\frac{3}{15}$

$3 \div 3 = 1$
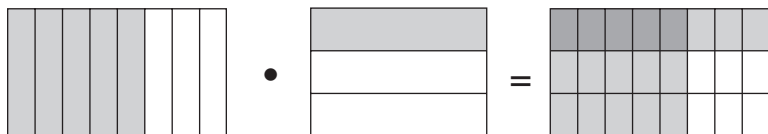$15 \div 3 = 5$

Simplify.

= $\frac{1}{5}$

Problem 2

How do I evaluate an expression?

Evaluate $a \cdot \frac{1}{3}$ for $a = \frac{5}{8}$.

Replace a with $\frac{5}{8}$.

$\frac{5}{8} \cdot \frac{1}{3}$ = $\frac{5 \cdot 1}{8 \cdot 3}$ = $\frac{5}{24}$

Multiply numerators and denominators.

Think and Discuss

1. In Problem 1 how do you simplify the fraction $\frac{3}{15}$?

_____

2. Explain how using a model can help you to multiply fractions.

_____

Holt McDougal Mathematics

MA.6.A.1.2, MA.6.A.1.3

GUIDED PRACTICE

See Example 1 Multiply. Write each answer in simplest form.

1. $\frac{1}{2} \cdot \frac{1}{3}$ 2. $\frac{2}{5} \cdot \frac{1}{4}$ 3. $\frac{4}{7} \cdot \frac{3}{4}$ 4. $\frac{5}{6} \cdot \frac{3}{5}$

See Example 2 Evaluate the expression $b \cdot \frac{1}{5}$ for each value of b. Write the answer in simplest form.

5. $b = \frac{2}{3}$ 6. $b = \frac{5}{8}$ 7. $b = \frac{1}{4}$ 8. $b = \frac{3}{5}$

INDEPENDENT PRACTICE

See Example 1 Multiply. Write each answer in simplest form.

9. $\frac{1}{3} \cdot \frac{2}{7}$ 10. $\frac{1}{3} \cdot \frac{1}{5}$ 11. $\frac{5}{6} \cdot \frac{2}{3}$ 12. $\frac{1}{3} \cdot \frac{6}{7}$

13. $\frac{3}{10} \cdot \frac{5}{6}$ 14. $\frac{7}{9} \cdot \frac{3}{5}$ 15. $\frac{1}{2} \cdot \frac{10}{11}$ 16. $\frac{3}{5} \cdot \frac{3}{4}$

See Example 2 Evaluate the expression $x \cdot \frac{1}{6}$ for each value of x. Write the answer in simplest form.

17. $x = \frac{4}{5}$ 18. $x = \frac{6}{7}$ 19. $x = \frac{3}{4}$ 20. $x = \frac{5}{6}$

21. $x = \frac{8}{9}$ 22. $x = \frac{9}{10}$ 23. $x = \frac{5}{8}$ 24. $x = \frac{3}{8}$

PRACTICE AND PROBLEM SOLVING

Find each product. Simplify the answer.

25. $\frac{3}{5} \cdot \frac{4}{9}$ 26. $\frac{5}{12} \cdot \frac{9}{10}$ 27. $\frac{2}{5} \cdot \frac{2}{7} \cdot \frac{5}{8}$ 28. $\frac{2}{7} \cdot \frac{1}{8}$

29. $\frac{6}{7} \cdot \frac{9}{10}$ 30. $\frac{4}{9} \cdot \frac{2}{3}$ 31. $\frac{1}{2} \cdot \frac{2}{5} \cdot \frac{9}{11}$ 32. $\frac{1}{12} \cdot \frac{3}{7}$

33. A walnut muffin recipe calls for $\frac{3}{4}$ cup walnuts. Mrs. Hooper wants to make $\frac{1}{3}$ of the recipe. What fraction of a cup of walnuts will she need?

34. Jim spent $\frac{5}{6}$ of an hour doing chores. He spent $\frac{2}{5}$ of that time washing dishes. What fraction of an hour did he spend washing dishes?

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

35. $\frac{2}{3} \cdot \frac{1}{4}$ ▉ $\frac{1}{3} \cdot \frac{3}{4}$ 36. $\frac{3}{5} \cdot \frac{3}{4}$ ▉ $\frac{1}{2} \cdot \frac{9}{10}$ 37. $\frac{5}{6} \cdot \frac{2}{3}$ ▉ $\frac{1}{3} \cdot \frac{2}{3}$

38. $\frac{5}{8} \cdot \frac{1}{4}$ ▉ $\frac{2}{9} \cdot \frac{1}{7}$ 39. $\frac{2}{5} \cdot \frac{1}{10}$ ▉ $\frac{3}{5} \cdot \frac{2}{3}$ 40. $\frac{1}{2} \cdot \frac{4}{5}$ ▉ $\frac{10}{20} \cdot \frac{16}{20}$

41. A multiplying number machine uses a rule to change one fraction into another fraction. The machine changed $\frac{1}{2}$ into $\frac{1}{8}$, $\frac{1}{5}$ into $\frac{1}{20}$, and $\frac{5}{7}$ into $\frac{5}{28}$.

    a. What is the rule?

    b. Into what fraction will the machine change $\frac{1}{3}$?

O = **WORKED-OUT SOLUTIONS**
on p. WS6

42. Alex exercised for $\frac{3}{4}$ hour. He lifted weights for $\frac{1}{5}$ of that time. What fraction of an hour did he spend lifting weights?

43. Life Science A bat can eat half its weight in insects in one night. If a bat weighing $\frac{3}{4}$ lb eats half its weight in insects, how much do the insects weigh?

44. Multi-Step Once, 20 million bison roamed the United States. Now, there are only $\frac{1}{40}$ of that number of bison. Of those, only $\frac{1}{25}$ roam in the wild. The number of American bison currently roaming in the wild is what fraction of 20 million? How many bison is that?

45. The seating plan shows Oak School's theater. The front section has $\frac{3}{4}$ of the seats, and the rear section has $\frac{1}{4}$ of the seats. The school has reserved $\frac{1}{2}$ of the seats in the front section for students.

   a. What fraction of the seating is reserved for students?

   b. The theater has 960 seats. How many seats are reserved for students?

46. Write a Problem Use the seating plan to write a problem in which you need to multiply two fractions. Then solve the problem.

47. Write About It Explain how you can use the GCF before multiplying so that the product of two fractions is in simplest form.

48. Challenge Simplify the expression.
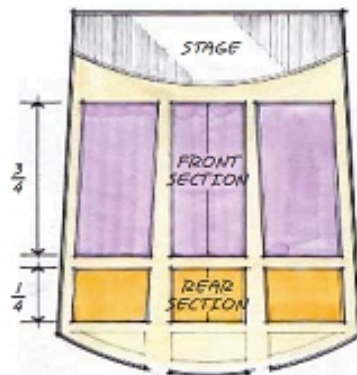
$$\frac{(2+6)}{5} \cdot \frac{1}{4} \cdot 6$$

49. Multiple Choice Which shows the product of $\frac{4}{5}$ and $\frac{3}{5}$ in simplest form?

  A. $1\frac{2}{5}$ **B.** $1\frac{1}{3}$ **C.** $\frac{3}{5}$ **D.** $\frac{12}{25}$

50. Multiple Choice Julie spent $\frac{1}{3}$ of her birthday money on new clothes. She spent $\frac{3}{10}$ of that money on shoes. What fraction of her birthday money did Julie spend on shoes?

  F. $\frac{1}{30}$ **G.** $\frac{1}{10}$ **H.** $\frac{2}{15}$ **I.** $\frac{3}{13}$

Solve each equation. (Lesson 2-7)

51. $15n = 45$ **52.** $7t = 147$ **53.** $6a = 78$ **54.** $12b = 216$
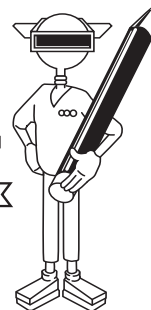
Estimate each product or quotient. (Lesson 3-2)

55. 0.49×3.9 **56.** $11.85 \div 4.211$ **57.** $14.75 \div 2.76$ **58.** 6.89×3.02

COURSE: **MSC III**
MODULE 3: **Fractions**
UNIT 3: **Multiplication and Division**

Finding Products

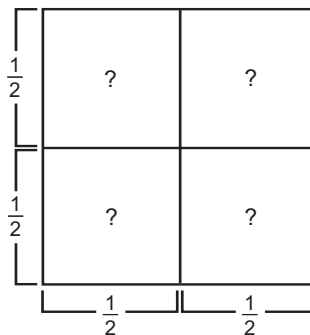**Student Logbook**

As you work through the tutorial, complete the following.

1. What is your mission for this lesson? _____

_____

2. The area of a rectangle can be found by multiplying its _____ and its _____.

3. The large square on the right has a length and width of 7 units.

a. The area of each small square is _____ divided by _____ , and is equal to _____ .

b. The length and width of each small square is _____ , so the area of each small square can be written as _____ $\times$ _____ which equals _____ .

4. The product of two fractions is equal to the product of the _____ over the product of the _____.

5. To complete the next step in finding the value of $\frac{1}{2} \times \frac{1}{4}$, you can write the fraction _____ over _____ . Simplifying this fraction gives you _____ .

6. When you multiply a number by a fraction _____ than 1, the product will be less than the number multiplied.
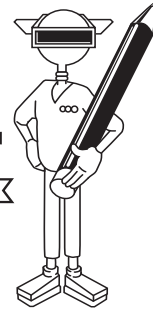
Key Words:
Fraction
Denominator
Numerator

Learning Objectives:
- Calculate products of proper and improper fractions.
- Calculate products of fractions and mixed numbers.
- Estimate the products of two fractions.

In the figure: $\frac{1}{2}$, $\frac{1}{2}$ on left side; ? ? / ? ? inside squares; $\frac{1}{2}$ $\frac{1}{2}$ along bottom.

Destination
Math

Student Logbook

7. To multiply a whole number and a fraction, first you can write the whole number as a(n) _____ fraction whose denominator is one .

8. What does the letter *L* represent in each of the mathematical expressions?

_____

9. If $L = 2\frac{3}{4}$ feet, you can multiply _____ and _____ to find the length of the string that will play high Do.

10. Before finding the value of $\frac{1}{2} \times 2\frac{3}{4}$, you can change the mixed number $2\frac{3}{4}$ to a(n) _____ fraction.

11. What is $\frac{1}{2} \times \frac{11}{4}$ written as an improper fraction? _____

12. What is mixed number that is the length of the string that will play high Do? _____

13. The value of $\frac{2}{3} \times 2\frac{3}{4}$ is less than $2\frac{3}{4}$ because _____ is less than _____ .

14. a. Write the expression $\frac{2}{3} \times 2\frac{3}{4}$ as the product of a fraction and an improper fraction. _____

b. What is the improper fraction that is the product? _____

c. Express the product in part (b) in lowest terms. _____

d. Express the product as a mixed number. _____

Destination
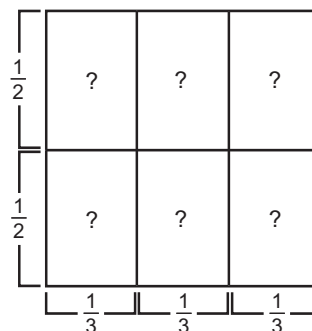Math

Name _____   Date _____

COURSE: **MSC III**
MODULE 3: **Fractions**
UNIT 3: **Multiplication and Division**

Your Turn

1. The large square on the right has a
length and width if 1. It is divided into
6 rectangles whose sides are $\frac{1}{2}$ and $\frac{1}{3}$.

| $\frac{1}{2}$ | ? | ? | ? |
| $\frac{1}{2}$ | ? | ? | ? |

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

a. The area of each small rectangle
   is _____ divided by _____ , which
   is equal to _____ .

b. Write the multiplication expression that represents each area.

   _____ $\times$ _____ = _____

2. Find each product. Write your answers as proper fractions or mixed
numbers in lowest terms.

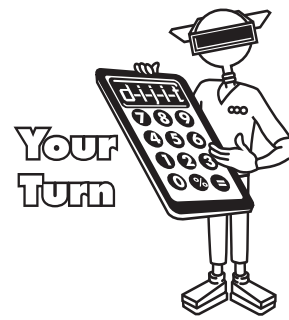   **a.** $\frac{2}{3} \times \frac{1}{4} =$ _____   **b.** $4 \times \frac{3}{7} =$ _____

   c. $\frac{3}{5} \times \frac{2}{9} =$ _____   **d.** $\frac{1}{6} \times 8 =$ _____

   e. $\frac{7}{8} \times \frac{2}{5} =$ _____   **f.** $\frac{2}{3} \times \frac{5}{8} =$ _____

3. Each week, a volunteer works 15 hours at her local public library.
She has completed $\frac{4}{5}$ of her hours this week. How many hours has
she worked this week? _____ Show your work.

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Destination
Math

111

4. Find each product. Write your answers in lowest terms.

a. $\frac{3}{4} \times 1\frac{2}{3} = $ _____   **b.** $2\frac{1}{7} \times \frac{4}{5} = $ _____

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

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

5. At the start of a trip, a bus driver notices that the gas tank contains $8\frac{2}{5}$ gallons of gas. At the end of the trip, The driver has used $\frac{5}{8}$ of the gas in the tank.

a. Write an expression that shows how much gas the bus driver used on his trip. _____

b. Will the product of your expression be greater than or less than $8\frac{2}{5}$? _____
Explain your answer without finding the product._____
_____

c. Find the actual number of gallons of gas that the bus driver used on his trip. Write your answer in lowest terms. _____

6. Each question on a social studies test is worth $3\frac{1}{3}$ points. If a student answers 24 questions correctly, how many points does she earn on the test? _____ Show your work.

Destination
Math

Name _____ Date _____ Class _____

Practice A

Multiplying Mixed Numbers

Multiply. Write each answer in simplest form.

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

   $\frac{1}{2} \cdot \frac{}{3}$

   _____

2. $1\frac{1}{5} \cdot \frac{4}{5}$

   $\frac{}{5} \cdot \frac{4}{5}$

   _____

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

   $\frac{}{4} \cdot \frac{2}{3}$

   _____

4. $1\frac{1}{8} \cdot \frac{2}{5}$

   $\frac{}{8} \cdot \frac{2}{5}$

   _____

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

   $\frac{2}{5} \cdot \frac{}{2}$

   _____

6. $1\frac{3}{5} \cdot \frac{1}{3}$

   $\frac{}{5} \cdot \frac{1}{3}$

   _____

7. $\frac{2}{7} \cdot 1\frac{1}{4}$

   _____

8. $\frac{2}{3} \cdot 1\frac{1}{10}$

   _____

9. $\frac{1}{8} \cdot 1\frac{1}{2}$

   _____

Find each product. Write the answer in simplest form.

10. $\frac{4}{5} \cdot 1\frac{1}{6}$

    _____

11. $\frac{3}{5} \cdot 1\frac{1}{4}$

    _____

12. $1\frac{3}{4} \cdot \frac{1}{3}$

    _____

13. $2 \cdot 1\frac{1}{2}$

    _____

14. $4 \cdot 2\frac{1}{4}$

    _____

15. $5 \cdot 1\frac{1}{5}$

    _____

16. Lin Li makes two and a half dollars per hour baby-sitting her little brother. How much money will she make if she baby-sits for 5 hours?

_____

17. Andrea is baking 2 batches of cookies. The recipe calls for $4\frac{1}{2}$ cups of flour for each batch. How many cups of flour will she use?

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Reading Strategies
Use a Flow Chart

Mixed Number

Whole number $\longrightarrow$ $2\dfrac{1}{2}$ $\longleftarrow$ Fraction

Improper Fraction

$$\dfrac{5}{2}$$

You can change mixed numbers to improper fractions.

$2\dfrac{1}{2}$ = 5 halves or $\dfrac{5}{2}$ $\longleftarrow$ improper fraction
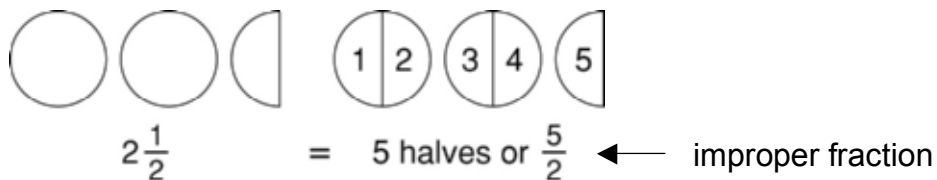
1. What is the mixed number in the above example? _____

2. What is the improper fraction? _____

3. How many halves are in $2\dfrac{1}{2}$? _____

Use the flowchart below to help you change a mixed number to an improper fraction.

| Multiply the denominator by the whole number. | $\rightarrow$ | Add the numerator. | $\rightarrow$ | The denominator stays the same. |
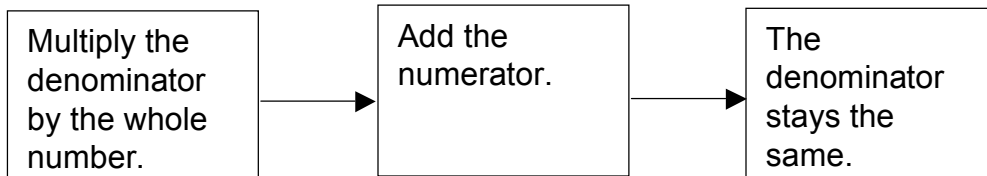
Change $3\dfrac{2}{5}$ to an improper fraction.

4. What is the first step?

_____

5. What is the next step?

_____

6. The improper fraction is _____.

Holt McDougal Mathematics

LESSON 5-7

Review for Mastery

Multiplying Mixed Numbers

To find $\frac{1}{3}$ of $2\frac{1}{2}$, first change $2\frac{1}{2}$ to an improper fraction.

$2\frac{1}{2} = \frac{5}{2}$

Then multiply as you would with two proper fractions.

Check to see whether you can divide by the GCF to make the problem simpler. Then multiply the numerators and multiply the denominators.

The problem is now $\frac{1}{3} \cdot \frac{5}{2}$.

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

So, $\frac{1}{3} \cdot 2\frac{1}{2}$ is $\frac{5}{6}$.

Rewrite each mixed number as an improper fraction. Is it possible to simplify before you multiply? If so, what is the GCF? Find each product. Write the answer in simplest form.

1. $\frac{1}{4} \cdot 1\frac{1}{3}$

   $= \frac{1}{4} \cdot$ _____

   _____

2. $\frac{1}{6} \cdot 2\frac{1}{2}$

   $= \frac{1}{6} \cdot$ _____

   _____

3. $\frac{1}{8} \cdot 1\frac{1}{2}$

   $= \frac{1}{8} \cdot$ _____

   _____

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

   $= \frac{1}{3} \cdot$ _____

   _____

5. $1\frac{1}{3} \cdot 1\frac{2}{3}$

   $\overline{3} \cdot \overline{3}$

   _____

6. $1\frac{1}{2} \cdot 1\frac{1}{3}$

   $\overline{2} \cdot \overline{3}$

   _____

7. $1\frac{3}{4} \cdot 2\frac{1}{2}$

   $\overline{4} \cdot \overline{2}$

   _____

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

   $\overline{6} \cdot \overline{3}$

   _____

9. $3\frac{1}{3} \cdot \frac{2}{5}$

   _____

10. $2\frac{1}{2} \cdot \frac{1}{5}$

    _____

11. $1\frac{3}{4} \cdot 2\frac{1}{2}$

    _____

12. $3\frac{1}{3} \cdot 1\frac{1}{5}$

    _____

Holt McDougal Mathematics

LESSON 5-7 **Student Worksheet**
Multiplying Mixed Numbers

Problem 1

How do I multiply a fraction by a mixed number?

$\frac{1}{3}$ • $1\frac{1}{2}$

Think: $1\frac{1}{2} = \frac{(2 \cdot 1) + 1}{2}$

$= \frac{3}{2}$

Rewrite $1\frac{1}{2}$ as $\frac{3}{2}$.

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

Multiply.

= $\frac{1}{2}$

Simplify.

Problem 2

How do I multiply two mixed numbers?

$2\frac{1}{2}$ • $1\frac{1}{3}$

Think: $2\frac{1}{2} = \frac{(2 \cdot 2) + 1}{2}$

$= \frac{5}{2}$

Think: $1\frac{1}{3} = \frac{(3 \cdot 1) + 1}{3}$

$= \frac{4}{3}$

Rewrite $2\frac{1}{2}$ as $\frac{5}{2}$ and $1\frac{1}{3}$ as $\frac{4}{3}$.

$\frac{5}{2}$ • $\frac{4}{3}$ = $\frac{20}{6}$

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

Multiply.

Simplify.

Think and Discuss

1. Why is the product of the numbers in Problem 1 not $1\frac{1}{6}$?

_____

_____

2. What is the first thing you should do when you need to multiply two mixed numbers?

_____

Exercises

GUIDED PRACTICE

See Example **1** Multiply. Write each answer in simplest form.

1. $1\frac{1}{4} \cdot \frac{2}{3}$ **2.** $2\frac{2}{3} \cdot \frac{1}{4}$ **3.** $\frac{3}{7} \cdot 1\frac{5}{6}$

4. $1\frac{1}{3} \cdot \frac{6}{7}$ **5.** $\frac{2}{3} \cdot 1\frac{3}{10}$ **6.** $2\frac{6}{11} \cdot \frac{2}{7}$

See Example **2** Find each product. Write the answer in simplest form.

7. $1\frac{5}{6} \cdot 1\frac{1}{8}$ **8.** $2\frac{2}{5} \cdot 1\frac{1}{12}$ **9.** $4 \cdot 5\frac{3}{7}$

10. $2\frac{3}{4} \cdot 1\frac{5}{6}$ **11.** $2\frac{3}{8} \cdot 5\frac{1}{5}$ **12.** $10\frac{1}{2} \cdot 1\frac{1}{4}$

INDEPENDENT PRACTICE

See Example **1** Multiply. Write each answer in simplest form.

13. $1\frac{1}{4} \cdot \frac{3}{4}$ **14.** $\frac{4}{7} \cdot 1\frac{1}{4}$ **15.** $1\frac{1}{6} \cdot \frac{2}{5}$ **16.** $2\frac{1}{6} \cdot \frac{3}{7}$

17. $\frac{5}{9} \cdot 1\frac{9}{10}$ **18.** $2\frac{2}{9} \cdot \frac{3}{5}$ **19.** $1\frac{3}{10} \cdot \frac{5}{7}$ **20.** $\frac{3}{4} \cdot 1\frac{2}{5}$

See Example **2** Find each product. Write the answer in simplest form.

21. $1\frac{1}{3} \cdot 1\frac{5}{7}$ **22.** $1\frac{2}{3} \cdot 2\frac{3}{10}$ **23.** $4 \cdot 3\frac{7}{8}$ **24.** $6 \cdot 2\frac{1}{3}$

25. $5 \cdot 4\frac{7}{10}$ **26.** $2\frac{2}{3} \cdot 3\frac{5}{8}$ **27.** $1\frac{1}{2} \cdot 2\frac{2}{5}$ **28.** $3\frac{5}{6} \cdot 2\frac{3}{4}$

PRACTICE AND PROBLEM SOLVING

Write each product in simplest form.

29. $1\frac{2}{3} \cdot \frac{2}{9}$ **30.** $3\frac{1}{3} \cdot \frac{7}{10}$ **31.** $2 \cdot \frac{5}{8}$ **32.** $2\frac{8}{11} \cdot \frac{3}{10}$

33. $\frac{3}{8} \cdot \frac{4}{9}$ **34.** $2\frac{1}{12} \cdot 1\frac{3}{5}$ **35.** $3\frac{3}{10} \cdot 4\frac{1}{6}$ **36.** $2\frac{1}{4} \cdot 1\frac{2}{9}$

(37.) $2 \cdot \frac{4}{5} \cdot 1\frac{2}{3}$ **38.** $3\frac{5}{6} \cdot \frac{9}{10} \cdot 4\frac{2}{3}$ **39.** $1\frac{7}{8} \cdot 2\frac{1}{3} \cdot 4$ **40.** $1\frac{2}{7} \cdot 3 \cdot 2\frac{5}{8}$

41. **Multi-Step** Jared used $1\frac{2}{5}$ bags of soil for his garden. He is digging another garden that will need $\frac{1}{5}$ as much soil as the original. How much will he use total?

42. Milo is making $1\frac{1}{2}$ batches of muffins. If one batch calls for $1\frac{3}{4}$ cups flour, how much flour will he need?

43. **Critical Thinking** Is the product of two mixed numbers less than, between, or greater than the two factors?

Evaluate each expression.

44. $\frac{1}{2} \cdot c$ for $c = 4\frac{2}{5}$ **45.** $1\frac{5}{7} \cdot x$ for $x = \frac{5}{6}$ **46.** $1\frac{3}{4} \cdot b$ for $b = 1\frac{1}{7}$

47. $1\frac{5}{9} \cdot n$ for $n = 18$ **48.** $2\frac{5}{9} \cdot t$ for $t = 4$ **(49.)** $3\frac{3}{4} \cdot p$ for $p = \frac{1}{2}$

50. $\frac{4}{5} \cdot m$ for $m = 2\frac{2}{3}$ **51.** $6y$ for $y = 3\frac{5}{8}$ **52.** $2\frac{3}{5} \cdot c$ for $c = 1\frac{1}{5}$

○ = WORKED-OUT SOLUTIONS
on p. WS6

Muffins probably started out as a form of cake, or possibly as a variety of cornbread. Early muffins didn't have nearly as much variety as is available today.

Fresh Fruit Muffins

1 3/4 cups all-purpose flour
1/3 cup granulated sugar
2 1/2 teaspoons baking powder
1/2 teaspoon salt
3/4 cup milk
1 egg
1/3 cup butter, melted
1 cup fresh fruit

In a large bowl, whisk together dry ingredients. Add milk, egg, and butter, and mix until ingredients are moistened – do not over-beat. Stir in fruit and pour into greased muffin cups. Bake at 400°F for 20-25 minutes or until tops spring back when lightly touched. Makes 12 muffins.

Use the recipe for Exercises 53–57.

53. How much flour and baking powder would you need if you doubled the recipe?

54. How much baking powder is needed for half of the recipe?

55. Raquel is baking muffins for a bake sale at school. She plans on multiplying the recipe by $3\frac{1}{2}$.
    a. How much flour will she need?
    b. How much sugar will she need?
    c. How much salt will she need?

56. Each muffin contains $22\frac{1}{5}$ grams of carbohydrates. How many grams of carbohydrates are contained in 12 muffins?

57. ⭐ **Challenge** What is the smallest number by which you could multiply the entire recipe so that the amount of each ingredient would be a whole number?

Florida Spiral Review   MA.6.A.1.2, MA.6.A.3.2

58. **Multiple Choice** A chef uses $2\frac{1}{4}$ cups of water for a recipe. The chef doubled the recipe. How much water did the chef use?

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

59. **Gridded Response** Keith ate $\frac{1}{3}$ pound of grapes last week. Jamal ate five times as many grapes as Keith last week. How many pounds of grapes did Jamal eat?

60. **Short Response** Josh is training to run in a half-marathon. So far this week, he has run $6\frac{3}{8}$ miles on each of three days. What is the total distance Josh has run this week?

Solve each equation. (Lesson 2-8)

61. $7a = 35$ 62. $63 = 9d$ 63. $11g = 121$ 64. $85 = 17p$

Multiply. Write each answer in simplest form. (Lesson 5-5)

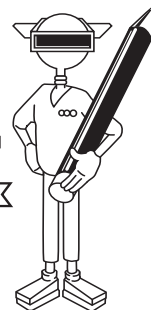65. $5 \times \frac{1}{10}$ 66. $21 \times \frac{1}{3}$ 67. $\frac{2}{7} \times 14$ 68. $\frac{5}{12} \times 2$

COURSE: **MSC IV**
MODULE 1: **Fractions**
UNIT 3: **Multiplying Fractions**

Finding Products of Fractions, Whole Numbers, & Mixed Numbers

Student Logbook

As you work through the tutorial, complete the following statements and questions.

1. How many people will Dijit's original pepperoni pizza recipe serve? _____

2. What fraction of a cup does the blue measuring cup hold? _____

3. Write the fraction that tells how much of the tub of pizza dough Dijit is not going to use. _____

4. Dividing by 3 is the same as multiplying by what number? _____

5. Write the mixed number $1\frac{1}{3}$ as an improper fraction in lowest terms. _____

6. According to the Earth Guide, how do you multiply fractions?
_____
_____

7. Is $\frac{1}{3}$ of $\frac{4}{3}$ equal to $\frac{1}{2}$? _____ Explain. _____
_____

8. Use Dijit's number line to find out about how many $\frac{1}{4}$ - cup measures are needed to make approximately $\frac{7}{9}$ of a cup of sauce.
_____

Key Words:
Proper fraction
Mixed number
Numerator
Denominator
Lowest terms
Multiply

**Learning Objectives:**
- Writing fractions in lowest terms
- Multiplying proper fractions and whole numbers
- Multiplying proper fractions and mixed numbers
- Multiplying fractions by multiplying numerators together and denominators together
- Using a number line to compare fractions

Destination
Math

COURSE: **MSC IV**
MODULE 1: **Fractions**
UNIT 3: **Multiplying Fractions**

Finding Products of Fractions, Whole Numbers, & Mixed Numbers

Your Turn
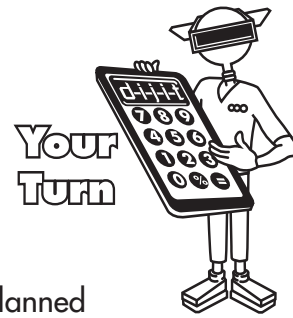
1. A group of hikers planned to walk $\frac{6}{9}$ of Grizzly's Trail. They planned to hike the remaining $\frac{3}{9}$ of the trail another day. Write $\frac{3}{9}$ as a fraction in lowest terms. _____

2. On another day, the hikers walked a trail that was 7 miles long. They walked $\frac{2}{3}$ of the trail before they stopped for water. How many miles did they walk before stopping?

_____

3. Mary and Dijit are sharing a meal, and Dijit plans to serve $1\frac{3}{4}$ cups of berries. If the cups of berries are divided equally, how many cups will each get? _____

4. Mary brings $\frac{3}{4}$ of a pint of ice cream to the meal, and eats $\frac{1}{3}$ of the pint. What fraction of the pint in lowest terms does Mary eat? _____

5. Dijit has $2\frac{1}{2}$ quarts of milk. Dijit drinks $\frac{3}{10}$ of the milk. What fraction of a quart, in lowest terms, did he drink? _____

6. Mary wants $\frac{7}{10}$ of a cup of chocolate sauce. Which of the four measuring cups (1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$) could she use to best approximate the amount of sauce she wants? (Use the number line below as a guide.)

_____
_____

Destination
Math
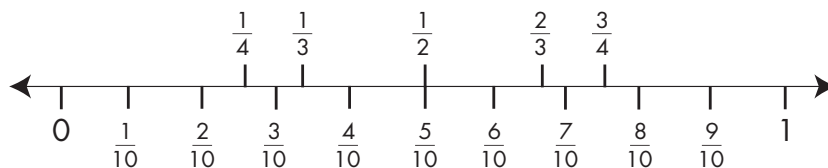
LESSON 5-8

Practice A

Dividing Fractions and Mixed Numbers

Find the reciprocal.

1. $\dfrac{1}{2}$

2. $\dfrac{2}{3}$

3. $\dfrac{1}{5}$

_____

_____

_____

4. $\dfrac{1}{3}$

5. $\dfrac{3}{5}$

6. $1\dfrac{1}{4}$

_____

_____

_____

7. $\dfrac{2}{5}$

8. $\dfrac{3}{7}$

9. $1\dfrac{1}{2}$

_____

_____

_____

Divide. Write each answer in simplest form.

10. $\dfrac{2}{3} \div 2$

$\dfrac{2}{3} \cdot$ _____

11. $\dfrac{1}{2} \div \dfrac{3}{4}$

$\dfrac{1}{2} \cdot$ _____

12. $\dfrac{5}{6} \div \dfrac{1}{4}$

$\dfrac{5}{6} \cdot$ _____

_____

_____

_____

13. $\dfrac{3}{5} \div \dfrac{1}{5}$

$\dfrac{3}{5} \cdot$ _____

14. $\dfrac{7}{9} \div 3$

$\dfrac{7}{9} \cdot$ _____

15. $1\dfrac{1}{2} \div \dfrac{1}{2}$

$1\dfrac{1}{2} \cdot$ _____

_____

_____

_____

16. Stella has 6 pounds of chocolate. She will use $\dfrac{2}{3}$ pound of the chocolate to make one cake. How many cakes can she make?

_____

17. Todd has $\dfrac{8}{9}$ pound of clay. He will use $\dfrac{1}{3}$ pound to make each action figure. How many action figures can he make?

_____

18. Dylan gives his two guinea pigs a total of $\dfrac{3}{4}$ cup of food every day. If each guinea pig gets the same amount of food, how much do they each get each day?
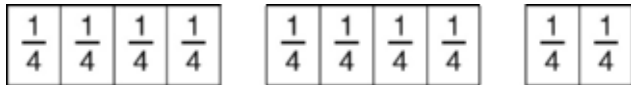
_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Reading Strategies

Using Models

Fraction bars help you picture dividing by fractions.

| $\frac{1}{4}$ | | $\frac{1}{2}$ |

In the problem $2\frac{1}{2} \div \frac{1}{4}$, think: How many one-fourths are there in $2\frac{1}{2}$?

| $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | | $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | | $\frac{1}{4}$ | $\frac{1}{4}$ |

Use the picture to answer each question.

1. Count the number of $\frac{1}{4}$'s in the fraction bars above. How many are there? _____

2. $2\frac{1}{2} \div \frac{1}{4} =$ _____

In the problem $2\frac{1}{2} \times 4$, think $2\frac{1}{2}$ four times.

$\frac{1}{2}$		$\frac{1}{2}$
$\frac{1}{2}$		$\frac{1}{2}$
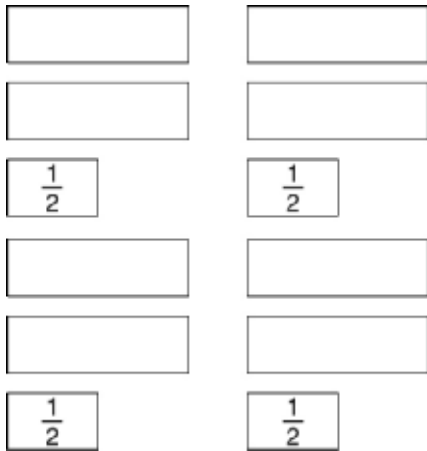
Use the picture to answer each question.

3. How many whole fraction bars are there? _____

4. How many one-half fraction bars are there? _____

5. When you add the whole bars and half bars together you get _____ whole bars.

6. Compare the multiplication and division examples. What do you notice about the answer you get when you divide by $\frac{1}{4}$ or multiply by 4?

_____

Holt McDougal Mathematics

LESSON 5-8

Review for Mastery

Dividing Fractions and Mixed Numbers

Two numbers are reciprocals if their product is 1. $\frac{2}{3}$ and $\frac{3}{2}$ are

reciprocals because $\frac{2}{3} \cdot \frac{3}{2} = \frac{6}{6} = 1$.

Dividing by a number is the same as multiplying by its reciprocal.

$$\frac{1}{4} \div 2 = \frac{1}{8} \qquad\qquad \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}$$

So, you can use reciprocals to divide by fractions.

To find $\frac{2}{3} \div 4$, first rewrite the expression as a multiplication

expression using the reciprocal of the divisor, 4.

$$\frac{2}{3} \cdot \frac{1}{4}$$

Then use canceling to find the product in simplest form.

$$\frac{2}{3} \div 4 = \frac{2}{3} \cdot \frac{1}{4} = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$$

To find $3\frac{1}{4} \div 1\frac{1}{2}$, first rewrite the expression using improper fractions.

$$\frac{13}{4} \div \frac{3}{2}$$

Next, write the expression as a multiplication expression.

$$\frac{13}{4} \cdot \frac{2}{3}$$

$$3\frac{1}{4} \div 1\frac{1}{2} = \frac{13}{4} \div \frac{3}{2} = \frac{13}{4} \cdot \frac{2}{3} = \frac{13}{2} \cdot \frac{1}{3} = \frac{13}{6} = 2\frac{1}{6}$$

Divide. Write each answer in simplest form.

1. $\frac{1}{4} \div 3$

$\frac{1}{4} \div \frac{}{1}$

_____ • _____

_____

2. $1\frac{1}{2} \div 1\frac{1}{4}$

$\frac{3}{2} \div \frac{}{4}$

_____ • _____

_____

3. $\frac{3}{8} \div 2$

$\frac{3}{8} \div \frac{}{1}$

_____ • _____

_____

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

$\frac{}{3} \div \frac{}{4}$

_____ • _____

_____

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

_____

6. $1\frac{1}{6} \div 2\frac{2}{3}$

_____

7. $\frac{1}{8} \div 4$

_____

8. $3\frac{1}{8} \div \frac{1}{2}$

_____

Holt McDougal Mathematics

Name _____ Date _____ Class _____

Student Worksheet
Dividing Fractions and Mixed Numbers

Problem 1

What is the reciprocal?

$\frac{1}{5}$ $\frac{1}{5}$ $\frac{5}{1}$

$\frac{3}{4}$ $\frac{3}{4}$ $\frac{4}{3}$

$\frac{7}{3}$ $\frac{7}{3}$ $\frac{3}{7}$
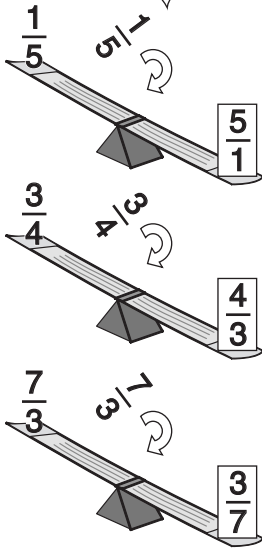
Problem 2

How do I divide a fraction?

$\frac{4}{5} \div$ 5

Multiply by the reciprocal.

$\frac{4}{5} \cdot$ $\frac{1}{5}$ $= \frac{4}{25}$

Think and Discuss

1. How do you find the reciprocal of a fraction?

_____

_____

2. Explain the steps you follow to divide $2\frac{1}{3}$ by $\frac{1}{3}$.

_____

_____

_____

3. What is the product of any given fraction times its reciprocal?

_____

_____

Holt McDougal Mathematics

MA.6.A.1.2, MA.6.A.1.3

GUIDED PRACTICE

See Example **1** Find the reciprocal.

1. $\frac{2}{7}$ 2. $\frac{5}{9}$ 3. $\frac{1}{9}$ 4. $\frac{3}{11}$ 5. $2\frac{3}{5}$

See Example **2** Divide. Write each answer in simplest form.

6. $\frac{5}{6} \div 3$ 7. $2\frac{1}{7} \div 1\frac{1}{4}$ 8. $\frac{5}{12} \div 5$ 9. $1\frac{5}{8} \div \frac{3}{4}$

10. $\frac{2}{3} \div \frac{1}{6}$ 11. $\frac{3}{10} \div 1\frac{2}{3}$ 12. $\frac{4}{7} \div 1\frac{1}{7}$ 13. $4 \div \frac{7}{8}$

INDEPENDENT PRACTICE

See Example **1** Find the reciprocal.

14. $\frac{7}{8}$ 15. $\frac{1}{10}$ 16. $\frac{3}{8}$ 17. $\frac{11}{12}$ 18. $2\frac{5}{8}$

19. $\frac{8}{11}$ 20. $\frac{5}{6}$ 21. $\frac{6}{7}$ 22. $\frac{2}{9}$ 23. $5\frac{1}{4}$

See Example **2** Divide. Write each answer in simplest form.

24. $\frac{7}{8} \div 4$ 25. $2\frac{3}{8} \div 1\frac{3}{4}$ 26. $\frac{8}{9} \div 12$ 27. $9 \div \frac{3}{4}$

28. $3\frac{5}{6} \div 1\frac{5}{9}$ 29. $\frac{9}{10} \div 3$ 30. $2\frac{4}{5} \div 1\frac{5}{7}$ 31. $3\frac{1}{5} \div 1\frac{2}{7}$

32. $\frac{5}{8} \div \frac{1}{2}$ 33. $1\frac{1}{2} \div 2\frac{1}{4}$ 34. $\frac{7}{12} \div 2\frac{5}{8}$ 35. $\frac{1}{8} \div 5$

PRACTICE AND PROBLEM SOLVING

Multiply or divide. Write each answer in simplest form.

36. $2\frac{3}{4} \div 2\frac{1}{5}$ 37. $4\frac{4}{5} \div 2\frac{6}{7}$ 38. $\frac{3}{8} \cdot \frac{5}{12}$

39. $6 \cdot \frac{7}{9}$ 40. $3\frac{1}{7} \div 5$ 41. $\frac{9}{14} \cdot \frac{1}{6}$

42. At Lina's restaurant, one serving of chili is $1\frac{1}{2}$ cups. The chef makes 48 cups of chili each night. How many servings of chili are in 48 cups?

43. Rhula bought 12 lb of raisins. She packed them into freezer bags so that each bag weighs $\frac{3}{4}$ lb. How many freezer bags did she pack?

Decide whether the fractions in each pair are reciprocals. If not, write the reciprocal of each fraction.

44. $\frac{1}{2}, 2$ 45. $\frac{3}{8}, \frac{16}{6}$ 46. $\frac{7}{9}, \frac{21}{27}$ 47. $\frac{5}{6}, \frac{12}{10}$

48. $1\frac{1}{2}, \frac{2}{3}$ 49. $\frac{2}{5}, \frac{4}{25}$ 50. $\frac{3}{7}, 2\frac{1}{3}$ 51. $5, \frac{5}{1}$

52. Lisa had some wood that was $12\frac{1}{2}$ feet long. She cut it into 5 pieces that are equal in length. How long is each piece of wood?

53. **Critical Thinking** How can you recognize the reciprocal of a fraction?

○ = WORKED-OUT SOLUTIONS
on p. WS6

Multiply or divide. Write each answer in simplest form.

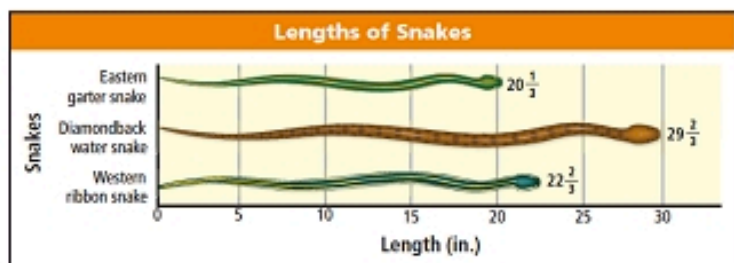**54.** $\frac{11}{12} \cdot \frac{9}{10} \div 1\frac{1}{4}$ **55.** $2\frac{3}{4} \cdot 1\frac{2}{3} \div 5$ **56.** $1\frac{1}{2} \div \frac{3}{4} \cdot \frac{2}{5}$

57. $\frac{3}{4} \cdot \left(\frac{5}{7} \div \frac{1}{2}\right)$ **58.** $4\frac{2}{3} \div \left(6 \cdot \frac{3}{5}\right)$ **59.** $5\frac{1}{5} \cdot \left(3\frac{2}{5} \cdot 2\frac{1}{3}\right)$

Life Science The bar graph shows the lengths of some species of snakes found in the United States. Use the bar graph for Exercises 60–62.

Lengths of Snakes

Eastern garter snake $20\frac{1}{3}$
Diamondback water snake $29\frac{2}{3}$
Western ribbon snake $22\frac{2}{3}$

Length (in.)

60. Is the length of the eastern garter snake greater than or less than $\frac{1}{2}$ yd? Explain.

61. What is the average length of all the snakes?

62. Jim measured the length of a rough green snake. It was $27\frac{1}{3}$ in. long. What would the average length of the snakes be if Jim's measure of a rough green snake were added?

63. **What's the Error?** A student said the reciprocal of $6\frac{2}{3}$ is $6\frac{3}{2}$. Explain the error. Then write the correct reciprocal.

64. **Write About It** Explain how to divide fractions to find $\frac{3}{4} \div 2\frac{1}{3}$.

65. **Challenge** Evaluate the expression $\frac{(6-3)}{4} \div \frac{1}{8} \cdot 5$.

66. **Multiple Choice** A piece of wood was 12 feet long. Gene cut the wood into pieces $\frac{2}{3}$ foot long. How many pieces did Gene have?

  A. 4   **B.** 8   **C.** 16   **D.** 18

67. **Multiple Choice** Which product is NOT equal to 1?

  F. $\frac{2}{3} \cdot \frac{3}{2}$ **G.** $8 \cdot \frac{1}{8}$ **H.** $\frac{1}{9} \cdot \frac{9}{3}$ **I.** $\frac{2}{13} \cdot \frac{13}{2}$

Find the number of decimal places in each product. Then multiply. (Lesson 3-4)

68. 2.4×1.8 **69.** 19×0.5 **70.** 7.04×2.3 **71.** 0.4×0.1

Find each product. (Lesson 5-7)

72. $2\frac{2}{3} \cdot \frac{1}{8}$ **73.** $\frac{1}{4} \cdot 3\frac{1}{2}$ **74.** $1\frac{1}{4} \cdot 1\frac{2}{5}$ **75.** $2\frac{1}{5} \cdot 2\frac{2}{3}$
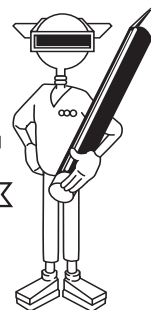
COURSE: **MSC III**
MODULE 3: **Fractions**
UNIT 3: **Multiplication and Division**

Quotients and Remainders

Student Logbook

As you work through the tutorial, complete the following.

1. What is your mission for this lesson? _____
_____

2. If the dividend stays the same, as the divisor decreases, the
the _____ increases.

3. The equation $6 \div 3 = 2$ tells us there are _____ threes in _____ .

4. Since there are 2 halves in 1, there are _____ halves
in 6. So, 6 divided by $\frac{1}{2}$ is _____ .

5. Since there are 3 thirds in 1, there are _____ thirds in 6.
So, 6 divided by $\frac{1}{3}$ is _____ .

6. What is the quotient of 6 and $\frac{1}{5}$? _____

7. In these division problems, as the divisors decrease from $\frac{1}{2}$, to $\frac{1}{3}$,
to $\frac{1}{5}$, (increase, decrease) the quotients (increase, decrease).
Circle your answer.

8. Complete each pair of equivalent expressions.

    a. $6 \div \frac{1}{2}$ = _____ $\div$ 6 $\times$ _____ = _____
    b. $6 \div \frac{1}{3}$ = _____ $\div$ 6 $\times$ _____ = _____
    c. $6 \div \frac{1}{5}$ = _____ $\div$ 6 $\times$ _____ = _____

9. Dividing a number by a fraction is the same as multiplying the
number and that fraction turned _____ _____ .
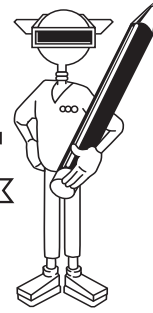So, $4 \div$ _____ = 24, and $4 \times$ _____ = 24.

Key Words:
Numerator
Denominator
Reciprocal

Learning Objectives:
• Divide a whole number by a proper fraction.
• Estimate the quotient of two mixed numbers or improper fractions.
• Divide two mixed numbers or improper fractions.

Destination
Math

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10. |If the product of two numbers is 1, the numbers are called

_____.

11. To divide a number by a fraction, multiply the number by the
_____ of the fraction.

12. a. In the expression $6 \div \frac{2}{3}$, What is the reciprocal of $\frac{2}{3}$? _____

b. Write $6 \div \frac{2}{3}$ as the product of 6 and the reciprocal
of $\frac{2}{3}$. _____ × _____

c. What is $6 \div \frac{2}{3}$? _____ .

13. Help Dijit estimate the quotient of $1\frac{2}{3} \div \frac{8}{9}$.

a. What is $1\frac{2}{3}$ rounded to the nearest whole number? _____
b. What is $\frac{8}{9}$ rounded to the nearest whole number? _____
c. The quotient of $1\frac{2}{3}$ and $\frac{8}{9}$ is approximately _____ .

14. Now help Dijit find the quotient of $1\frac{2}{3} \div \frac{8}{9}$.

a. Express $1\frac{2}{3}$ as an improper fraction in lowest terms. _____
b. Write $\frac{5}{3} \div \frac{8}{9}$ as the product of two factors. Then find the product.
_____ × _____ = _____
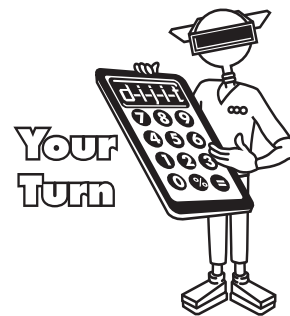**c.** The product is _____ , so $\frac{5}{3} \div \frac{8}{9}$ is _____ .
d. Express the answer in part (c) as an improper fraction in lowest
terms. _____
e. What mixed number is equal to the fraction in part (d)? _____

Destination
Math

COURSE: **MSC III**
MODULE 3: **Fractions**
UNIT 3: **Multiplication and Division**

Quotients and Remainders

1. Complete each pair of equivalent expressions.

a. $6 \div \frac{1}{8}$ = _____ ÷ 6 × _____ = _____
b. $5 \div \frac{1}{7}$ = _____ ÷ 5 × _____ = _____
c. $8 \div \frac{12}{1}$ = _____ ÷ 8 × _____ = _____

2. A seamstress has 7 yards of fabric that she cuts into pieces that are $\frac{1}{3}$ yard long.

a. What expression can you write to find how many $\frac{1}{3}$–yard pieces she will have? _____

b. What is the reciprocal of the divisor? _____

c. How many $\frac{1}{3}$–yard pieces does she have? _____

3. Complete each division. Write your answers in lowest terms.

a. $4 \div \frac{2}{5}$ = _____   **b.** $15 \div \frac{5}{8}$ = _____

c. $9 \div \frac{2}{3}$ = _____   **d.** $11 \div \frac{3}{4}$ = _____

4. Complete each division. Write your answers in lowest terms.

a. $4\frac{1}{2} \div \frac{3}{8}$ = _____   **b.** $1\frac{5}{6} \div \frac{4}{9}$ = _____

c. $6\frac{2}{3} \div 2\frac{1}{2}$ = _____   **d.** $9\frac{3}{4} \div \frac{3}{5}$ = _____

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Math

5. Mr. Keys picks $12\frac{3}{8}$ pounds of beans from his garden. He divides the beans into bags that each weigh $2\frac{3}{4}$ pounds.

a. What expression can you write to show how many bags Mr. Keys has. _____

b. Round $12\frac{3}{8}$ and $2\frac{3}{4}$ to the nearest whole number and estimate the number of bags Mr. Keys has. _____

c. How many bags of beans does Mr. Keys actually have? _____

d. Are there any beans left over? _____ If so, how much do the leftover beans weigh? _____

6. A chemist divides $5\frac{1}{4}$ grams of a powder into containers that each hold $\frac{7}{8}$ grams.

How many containers does the chemist fill? _____
Show your work.

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Math