Chapter 6
Fraction Operations

"To show you how well I understand fractions,
I only did half of my homework."

This package belongs to _____.

Chapter 6			
Date	Lesson Topic	Homework	Due Date
	6.0: Adding and Subtracting Fractions	• Get Ready p. 5 – 6 • Adding and Subtracting Fractions p. 7 – 8	
	6.1: Multiplying a fraction and a whole	• Worksheet 6.1 p. 11 – 12 Optional Textbook p. 203 # 13 - 17	
	6.2: Dividing a fractions and a whole	• Worksheet 6.2 p. 15 – 16 Optional Textbook p. 209 # 11 – 15	
	6.3: Multiplying proper fractions	• Worksheet 6.3 p. 19 – 20 Optional Textbook p. 215 #13 – 16	
	6.4: Multiplying Improper Fractions and Mixed Numbers	• Worksheet 6.4 p. 23 – 24 Optional Textbook p. 221 # 16 – 21	
	6.5 : Dividing Fractions and Mixed Numbers	• Worksheet 6.5 p. 27 – 28 Optional Textbook p. 229 # 20 – 23	
	6.6: Notes and Questions: Applying Fractional Operations	• Worksheet 6.6 p. 33 – 34 Optional Textbook p. 235 # 13 – 16	
	Ch.6 Review	Textbook p. 236 – 237 # 1 – 10, 12, 13, 15 – 17, 19 – 21, 24 – 26 Optional Ch.6 Practice Test	

Date:_____

6.0 Notes: Adding and Subtracting Fractions

There are 9 people attending a party. Each person eats two-thirds of a pizza. How many pizza's are needed to feed everyone?

We could use a diagram to add these up:

We could use an addition statement:

Hikaru eats a quarter of a chocolate bar, and Nathan eats a half of a chocolate bar.
How much did they eat together?

We can still use a diagram:

How do we add these using an addition statement?

When adding or subtracting fractions, you need to have a _____
denominator. Sometimes you will need to make _____ fractions.

Find the equivalent fraction:

a) $\dfrac{1}{2} \begin{smallmatrix} \times 2 \\ \\ \times 2 \end{smallmatrix} = -$

b) $\dfrac{1}{3} = \dfrac{3}{}$

c) $\dfrac{1}{2} = \dfrac{}{12}$

Note: It is best to work down the page in columns!

a) $\dfrac{1}{4} + \dfrac{1}{2} =$

b) $\dfrac{2}{3} + \dfrac{3}{4} =$

c) $\dfrac{4}{5} - \dfrac{2}{3}$

d) $\dfrac{5}{7} - \dfrac{1}{3}$

Add and Subtract Fractions

To add fractions with like denominators, add the numerators.

$\frac{1}{5}$

$+\frac{2}{5}$

$=\frac{3}{5}$

Each fraction in the above sum is a **proper fraction**, because the denominator is greater than the numerator.

To subtract fractions with unlike denominators, use a **common denominator**. This is a common multiple of the denominators.

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

$\frac{3}{6}$

$-\frac{1}{6}$

$=\frac{2}{6}$

Write the answer in lowest terms.

$\div\ ?$

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

$\div\ ?$

What is a common factor of 2 and 6?

1. Add. Write each answer in lowest terms.

a) $\frac{1}{6} + \frac{1}{6}$

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

c) $\frac{3}{10} + \frac{2}{5}$

2. Subtract. Write each answer in lowest terms.

a) $\frac{7}{8} - \frac{5}{8}$

b) $\frac{4}{5} - \frac{3}{10}$

c) $\frac{4}{5} - \frac{2}{3}$

Add and Subtract Mixed Numbers

A **mixed number** includes a whole number and a fraction.
Write the improper fraction as a mixed number.
$$1\frac{3}{8} + 2\frac{7}{8} = 3 + \frac{10}{8} = 3 + \frac{8}{8} + \frac{2}{8}$$

To subtract mixed numbers, use a common denominator.
$$4\frac{1}{2} - 2\frac{3}{4} = 4\frac{2}{4} - 2\frac{3}{4}$$

> **Literacy Link**
>
> An improper fraction has a numerator greater than the denominator.

If the second fraction is bigger than the first, use one of the following methods.

Use an Improper Fraction
$$4\frac{2}{4} - 2\frac{3}{4} = \frac{18}{4} - \frac{11}{4}$$
$$= \frac{7}{4}$$
$$= 1\frac{3}{4}$$

Use Regrouping
Regroup 1 whole from $4\frac{2}{4}$.
$$4\frac{2}{4} = 3 + \frac{4}{4} + \frac{2}{4}$$
$$= 3 + \frac{6}{4}$$
$$3\frac{6}{4} - 2\frac{3}{4} = 1\frac{3}{4}$$

> Subtract the whole numbers and subtract the fractions.

3. Add or subtract. Write each answer in lowest terms.

a) $1\frac{1}{5} + 2\frac{3}{5}$

b) $3\frac{1}{4} + 2\frac{3}{4}$

c) $2\frac{3}{5} - 1\frac{2}{5}$

d) $2\frac{6}{7} + 2\frac{4}{7}$

4. Add. Write each answer in lowest terms.

a) $1\frac{5}{8} + 2\frac{3}{4}$

b) $3\frac{1}{2} + 3\frac{4}{5}$

5. Subtract. Write each answer in lowest terms.

a) $3\frac{1}{2} - 1\frac{1}{3}$

b) $3\frac{3}{4} - 1\frac{1}{2}$

Order of Operations

The **order of operations** is the correct sequence of steps for a calculation.

$$30 - 14 \div (5 - 3) \times 4 + 6$$ Do brackets first.
$$= 30 - 14 \div 2 \times 4 + 6$$ Multiply and divide, from left to right.
$$= 30 - 28 + 6$$ Add and subtract, from left to right.
$$= 8$$

6. Calculate. Show your thinking.

a) $3 - 12 \div 2 + 4$

b) $8 + 18 \div 3 - 2 \times (4 + 1)$

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Name : _____   Score : _____

Teacher : _____   Date : _____

Adding Fractions

1) $\dfrac{1}{4} + \dfrac{9}{16} =$

2) $\dfrac{4}{5} + \dfrac{14}{25} =$

3) $\dfrac{1}{3} + \dfrac{9}{54} =$

4) $\dfrac{1}{18} + \dfrac{1}{6} =$

5) $\dfrac{4}{22} + \dfrac{4}{11} =$

6) $\dfrac{4}{11} + \dfrac{5}{55} =$

7) $\dfrac{10}{13} + \dfrac{16}{26} =$

8) $\dfrac{6}{8} + \dfrac{6}{16} =$

9) $\dfrac{13}{26} + \dfrac{6}{13} =$

10) $\dfrac{2}{4} + \dfrac{1}{3} =$

11) $\dfrac{7}{18} + \dfrac{2}{3} =$

12) $\dfrac{4}{10} + \dfrac{2}{5} =$

13) $\dfrac{11}{60} + \dfrac{1}{4} =$

14) $\dfrac{1}{6} + \dfrac{3}{4} =$

15) $\dfrac{3}{6} + \dfrac{11}{18} =$

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Math-Aids.Com
Fractions Worksheets

Subtracting Fractions

1) $\dfrac{4}{7} - \dfrac{6}{21} =$

2) $\dfrac{1}{6} - \dfrac{1}{8} =$

3) $\dfrac{16}{21} - \dfrac{9}{14} =$

4) $\dfrac{8}{11} - \dfrac{10}{55} =$

5) $\dfrac{2}{11} - \dfrac{6}{55} =$

6) $\dfrac{4}{9} - \dfrac{3}{18} =$

7) $\dfrac{14}{18} - \dfrac{7}{27} =$

8) $\dfrac{8}{13} - \dfrac{13}{26} =$

9) $\dfrac{3}{10} - \dfrac{1}{5} =$

10) $\dfrac{2}{4} - \dfrac{5}{11} =$

11) $\dfrac{7}{15} - \dfrac{1}{3} =$

12) $\dfrac{9}{36} - \dfrac{1}{6} =$

13) $\dfrac{2}{4} - \dfrac{1}{5} =$

14) $\dfrac{1}{3} - \dfrac{6}{54} =$

15) $\dfrac{3}{6} - \dfrac{1}{5} =$

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6.1 Notes: Multiplying a Fraction and a Whole

Multiplying Using Diagrams

Draw 2 diagrams that show $3 \times \dfrac{3}{4}$

Draw a diagram that shows $3 \times \dfrac{5}{6}$

Multiplying by Addition

a) $3 \times \dfrac{5}{8} =$

b) $\dfrac{2}{3} \text{ of } 4$

<u>Word Problems</u>

Keywords:

a) Charles has 40 hockey cards. Hector has $\frac{3}{4}$ as many pictures as Charles.
How many pictures does Hector have?

b) Penelope has $\frac{2}{3}$ as much money as Katie. Katie has $24. How much money
does Penelope have?

6.1 Multiplying a Fraction and a Whole Number

MathLinks 8, pages 198–203

Key Ideas Review

For #1 and #2, unscramble the letters to form a word that correctly completes the statement. Then, complete the examples.

1. Manipulatives and diagrams can be used to model a _____ statement.   ACIIILLMNOPTTU

   a) $4 \times \dfrac{1}{\square} = 1\dfrac{1}{\square}$
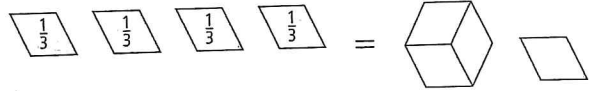
   b) $3 \times \dfrac{1}{\square} = 1\dfrac{1}{\square}$
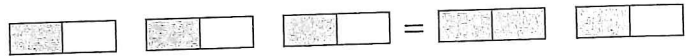
   c) $4 \times \dfrac{\square}{4} = \dfrac{\square}{4} = \square$
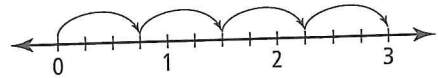
2. Multiplying a _____ and a whole number in   ACFINORT
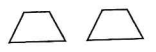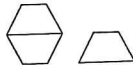
   _____ order gives the same result.   EEHIRT
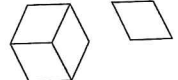
   $6 \times \dfrac{2}{3} = 4$ $\dfrac{\square}{\square} \times 6 = 4$

Practise and Apply

3. Write the multiplication statement that each diagram represents. A ⬡ represents one whole.
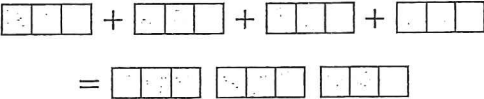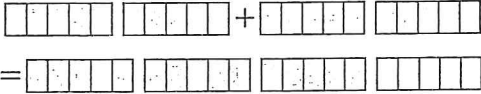
   a) △ △ △ △ = ▱ ▱
      = ▱ ▱

   b) △ △ △ = ⬡ ▱

   c) ▱ ▱ ▱ ▱ = ⬡ ▱

4. Write the multiplication statement represented by each diagram.

a) ☐☐☐ + ☐☐☐ + ☐☐☐ + ☐☐☐

= ☐☐☐ ☐☐☐ ☐☐☐

b) ☐☐☐☐ ☐☐☐☐ + ☐☐☐☐ ☐☐☐☐

= ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

c)

0   1
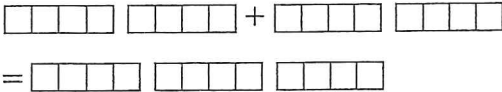
5. Shade each set of diagrams to determine the product.

a) $3 \times \frac{2}{5}$

☐☐☐☐ + ☐☐☐☐ + ☐☐☐☐ = ☐☐☐☐ ☐☐☐☐

b) $2 \times \frac{5}{4}$

☐☐☐☐ ☐☐☐☐ + ☐☐☐☐ ☐☐☐☐

= ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

6. Complete each number line to determine the product.

a) $6 \times \frac{1}{3}$

0   1   2

b) $8 \times \frac{1}{9}$

0   1
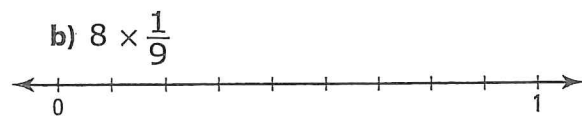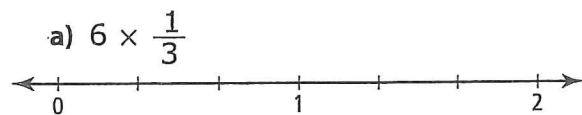
7. Determine each product. Show your thinking.
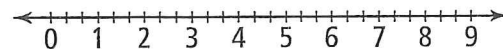
a) $3 \times \frac{1}{4}$

b) $5 \times \frac{1}{8}$

c) $4 \times \frac{1}{2}$

d) $3 \times \frac{5}{3}$

e) $2 \times \frac{3}{4}$

8. In the her first week on the job, Trindis worked 9 hours. In the second week she worked $\frac{2}{3}$ of that amount. Complete the number line to determine how many hours Trindis worked in the second week.

0 1 2 3 4 5 6 7 8 9

9. Marik had 11 friends at his birthday party. Each person ate $\frac{1}{4}$ of a pizza. How many pizza's did Marik and his friends eat? Write a multiplication statement to answer the question, then find the product.

10. Jeremy ran around a 150-m track $1\frac{1}{2}$ times. Show two different methods of finding the product of $1\frac{1}{2} \times 150$. How far did Jeremy run?

Date:_____

6.2 Notes: Dividing a Fraction and a Whole

Use the diagrams to model the division of a fraction by a whole number:

$\frac{2}{3} \div 2 =$
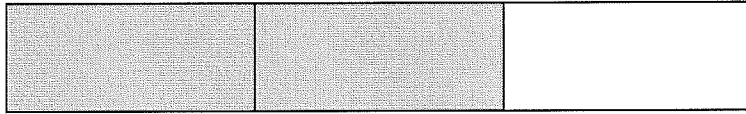
$\frac{1}{4} \div 3 =$

Division can also be modeled with a number line diagram:

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

y

x
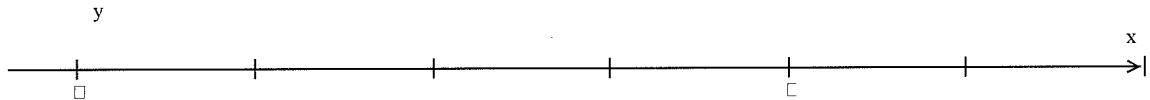
Division without a diagram:

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

· Use a denominator that is the product of the _____and _____

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Divide the following:

$$\frac{3}{2} \div 4$$
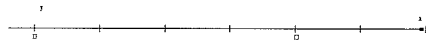
$$\frac{7}{8} \div 3$$

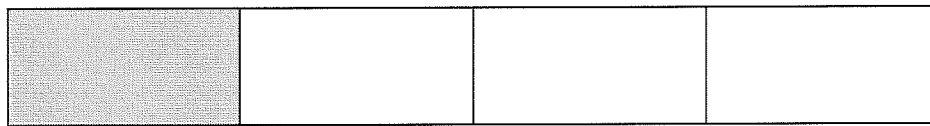$$\frac{2}{5} \div 7$$

$$\frac{1}{2} \div 2$$

Develop a shortcut that can be used for dividing a fraction by a whole.

1. Kevin can eat $\frac{3}{4}$ of a pizza in 2 hours. How much pizza can he eat in 1 hour?

2. Luke has $\frac{2}{3}$ of a chocolate bar left, which he gives to 5 hungry friends to share. If they share it equally, what fraction of the whole chocolate bar does each receive?

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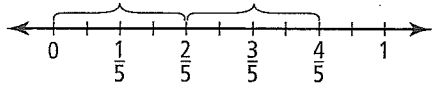
6.2 Dividing a Fraction by a Whole Number

MathLinks 8, pages 204–209

Key Ideas Review

Match each model in column B to a division statement in column A.

A	B
1. $\frac{1}{3} \div 3$ _____	a)
2. $\frac{5}{6} \div 4$ _____	b)
3. $\frac{4}{5} \div 2$ _____	c)

Practise and Apply

4. Determine each quotient. Use the pattern blocks to show your thinking. In this question, ⧜ represents 1 whole.

   a) $\frac{1}{2} \div 3$
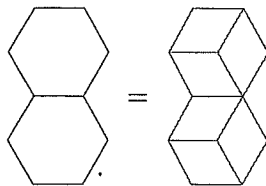
   b) $\frac{5}{6} \div 2$
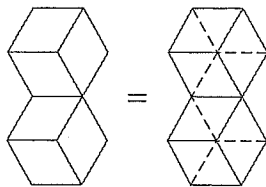
5. Determine each quotient. Use the fraction strips to show your thinking.

   a) $\frac{1}{3} \div 4$
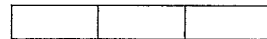
   b) $\frac{5}{6} \div 3$
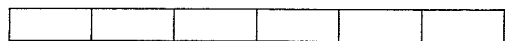
6. Determine each quotient by completing the number lines.

a) $\frac{2}{3} \div 3$
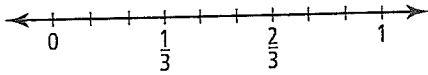
b) $\frac{3}{5} \div 2$
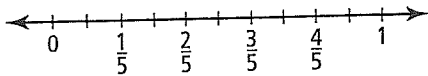
7. Jim and two friends offered to help Jim's father paint a room. There is $\frac{2}{3}$ of a can of paint left. If the paint is shared evenly, how much paint will each person get?

a) Write a division statement to answer this problem.

b) Use a model to determine the quotient.

8. A board that is $\frac{3}{5}$ of a metre long is cut in half. What fraction of a metre is each piece?

a) Write a division statement to answer this problem.

b) Use a model to determine the quotient.

9. Teresa finds $\frac{9}{12}$ of a chocolate bar to share with 3 friends. What fraction of a chocolate bar does each person get?

a) Write a division statement to answer this problem.

b) Use a model to determine the quotient.

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Date:_____

6.3 Notes: Multiplying Proper Fractions

<u>Multiplying without a Diagram</u>

Remember, a fraction is really a _____ question, so $\frac{3}{7}$ really means _____

This means that $\frac{2}{5} \times \frac{3}{7}$ really means _____

Recall the shortcuts for multiplying and dividing by a whole number:

     Multiplying

     Dividing

Multiply

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

Look at the numerators and denominators for the fractions in the question and the answer. What do you notice about them?

Summary:
When multiplying two proper fractions:

Remember to reduce to lowest terms

$$\frac{2}{3} \times \frac{3}{7} =$$ $$\frac{3}{4} \times \frac{2}{5} =$$ $$\frac{3}{4} \times \frac{2}{9} \times \frac{2}{3} =$$

How hard do you think it might be to reduce the answer to $\frac{15}{16} \times \frac{8}{35}$?

Note: It is actually possible to cross reduce before you multiply!

$$\frac{2}{3} \times \frac{3}{7} =$$ $$\frac{3}{4} \times \frac{2}{5} =$$ $$\frac{3}{4} \times \frac{2}{9} =$$

When can you cross reduce?
When you are reducing the _____ of one fraction and the
_____ of another

Eg: $\frac{3}{4} \times \frac{5}{12}$ Eg: $\frac{2}{5} \times \frac{4}{7} \times \frac{5}{7}$

Eg. In Jaycee's Pet store, three-eighths of the animals are fish, and two-fifteenths of the fish are tropical fish. What fraction of the animals in the store are tropical fish?

6.3 Multiplying Proper Fractions

MathLinks 8, **pages 210–215**

Key Ideas Review

Choose from the following terms to complete #1 to #3.

estimate   multiply   numerators   paper folding

1. Two proper fractions can be multiplied using _____ or diagrams.

2. A rule for multiplying two proper fractions is to multiply the

   _____ and _____ the denominators.

3. You can _____ the product of two proper fractions by first

   deciding whether each fraction is closer to 0, $\frac{1}{2}$, or 1.

Practise and Apply

4. Estimate and calculate each product. Show your thinking and express your answer in lowest terms.

   a) $\frac{2}{3} \times \frac{5}{6}$

   Circle the closest estimate: 0 $\frac{1}{2}$ 1

   b) $\frac{4}{9} \times \frac{1}{5}$

   Circle the closest estimate: 0 $\frac{1}{2}$ 1

   c) $\frac{2}{5} \times \frac{3}{8}$

   Circle the closest estimate: 0 $\frac{1}{2}$ 1

   d) $\frac{2}{3} \times \frac{3}{5}$

   Circle the closest estimate: 0 $\frac{1}{2}$ 1

   e) $\frac{7}{8} \times \frac{3}{5}$

   Circle the closest estimate: 0 $\frac{1}{2}$ 1

   f) $\frac{9}{10} \times \frac{8}{9}$

   Circle the closest estimate: 0 $\frac{1}{2}$ 1

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5. Tamara lives $\frac{3}{4}$ km from school. She runs $\frac{1}{3}$ of the distance and then walks the rest of the way to her house. How far does Tamara run? Show your thinking.

6. In a grade 8 class, $\frac{1}{2}$ of the students play piano. Of these students, $\frac{1}{4}$ also play guitar. What fraction of this class play both piano and guitar?

7. On a Saturday, Sid helped his father do yard work for $\frac{5}{6}$ of the afternoon. He mowed lawn for $\frac{3}{5}$ of this time. What fraction of the afternoon did Sid spend mowing the lawn? Estimate, then solve.

Estimate:

Solution:

8. Vancouver's population is approximately $\frac{2}{5}$ the population of Toronto. Québec City's population is approximately $\frac{1}{3}$ of Vancouver's population. Compare Québec City's population to Toronto's population.

9. Hayden's hard drive is $\frac{2}{5}$ filled. The operating system takes up $\frac{1}{10}$ of that space. How much of the whole hard drive is filled by the operating system? Use a model to show your thinking.

10. An order of bruschetta for 4 uses $\frac{1}{3}$ of a loaf of French bread. How much of a loaf does each person get when they share the order equally?

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Date: _____

6.4 Notes: Multiplying Improper Fractions
and Mixed Numbers

Remember:

An **improper fraction** is a fraction where the _____ is greater than the denominator.

A **mixed number** includes a _____ number and a _____ fraction.

Multiply:

$$\frac{11}{3} \times \frac{9}{2}$$

$$1\frac{1}{4} \times 1\frac{1}{3}$$

$$2\frac{1}{4} \times 2\frac{1}{4}$$

Summary:

When multiplying two mixed numbers:

<u>Calculate</u>:

$2\frac{1}{10} \times 3\frac{1}{2}$

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

<u>Word Problems</u>:

Jasmine worked $3\frac{1}{4}$ h a day for five days. How many hours did Jasmine work altogether? Show your work.

During the school year, the swim team practices $2\frac{3}{4}$ h per week. During the summer, the weekly practice time increases to $2\frac{1}{3}$ times the school year practice. How many hours per week does the team practice during the summer? Show your work.

6.4 Multiplying Improper Fractions and Mixed Numbers

MathLinks 8, pages 216–221

Key Ideas Review

1. Decide whether each of the following statements is true or false. Circle the word *True* or *False*. If the statement is false, rewrite it to make it true.

   a) **True/False** You can model the multiplication of two mixed numbers or improper fractions using partial areas of a rectangle.

   _____

   _____

   b) **True/False** You can calculate the product of two mixed numbers or improper fractions by multiplying the whole numbers closest to them.

   _____

   _____

   c) **True/False** Two mixed numbers can be multiplied by expressing them as improper fractions and then multiplying the numerators by the denominators.

   _____

   _____

Practise and Apply

2. Express each improper fraction as a mixed number.

   a) $\frac{9}{5}$ b) $\frac{13}{6}$

3. Express each mixed number as an improper fraction.

   a) $2\frac{1}{2}$ b) $4\frac{2}{3}$

4. Use a model to determine each product.

   a) $1\frac{1}{2} \times \frac{1}{3}$ b) $1\frac{1}{3} \times 2\frac{1}{4}$

5. Estimate and calculate. Show your thinking.

   a) $\frac{2}{3} \times \frac{6}{5}$

   Estimate: _____

   Calculate:

   b) $4 \times 2\frac{1}{3}$

   Estimate: _____

   Calculate:

   c) $1\frac{3}{4} \times 3\frac{1}{3}$

   Estimate: _____

   Calculate:

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6. One week, Kristi worked 3 days at a department store for $3\frac{1}{2}$ h each day. She was paid \$9/h.

   a) How many hours did Kristi work that week? Show your thinking.

   b) How much did Kristi earn that week?

7. Jupiter completes about $2\frac{2}{5}$ rotations every 24 hours (an Earth day). How many rotations does Jupiter complete in one Earth week? Show your thinking.

8. A sailboat is sailing at $8\frac{1}{2}$ km/h. If the weather conditions and the current do not change, how far will the sailboat travel in $1\frac{1}{3}$ h? Show your thinking.
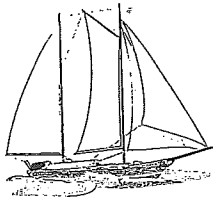
9. The distance to Grandma's house is $\frac{4}{5}$ of the distance to Uncle Glen's house. If Uncle Glen's house is $3\frac{1}{2}$ hours away, how long will it take to get to Grandma's house if you travel at the same speed?

10. It takes $\frac{3}{5}$ of a tank of gas to get to work and back each day. How much gas is used over 5 work days? Show your thinking.
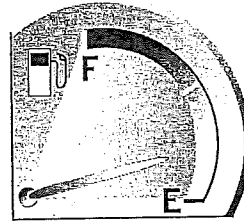
11. Owen is $2\frac{1}{4}$ times as old as Robin. When Robin celebrates his 8th birthday, how old will Owen be?

12. The karate club is arranging a grading for its members. It takes $3\frac{1}{4}$ hours to test a group of 4 candidates. How long will the club need the gym in order to process 3 groups of 4 candidates each?

Date:_____

6.5 Notes: Dividing Fractions

There are two methods for dividing fractions:

Method 1: Common Denominator
   Write the fractions with a _____ _____ and divide the

   _____.

Eg

$$\frac{7}{8} \div \frac{3}{8} =$$
                 $$\frac{4}{5} \div \frac{1}{2} =$$

$$\frac{13}{5} \div \frac{4}{3} =$$
               $$3\frac{1}{2} \div 1\frac{2}{3} =$$

Can $\frac{2}{3} \times \frac{5}{7}$ be changed into a division question?

Method 2: Divide Using a Multiplication

To divide a fraction, you can also _____ by its _____

Eg

$$\frac{7}{8} \div \frac{3}{8} =$$

$$\frac{13}{5} \div \frac{4}{3} =$$

$$\frac{4}{5} \div \frac{1}{2} =$$

$$3\frac{1}{2} \div 1\frac{2}{3} =$$

Reciprocal

Eg. Jorge has a very rare Yu-Gi-Oh card worth $5\frac{1}{2}$. This is $\frac{3}{4}$ of the original price he paid for it. What price was it when he bought it?

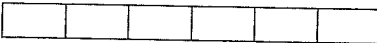## 6.5 Dividing Fractions and Mixed Numbers

MathLinks 8, pages 222–229

Key Ideas Review

Match each method in column A with the example in column B that best matches it.
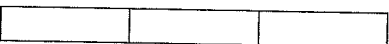
A	B
1. Use diagrams to estimate the quotient of two fractions. _____	a) $3\frac{3}{4} \div 1\frac{1}{2} = \frac{15}{4} \div \frac{3}{2}$ $= \frac{15}{4} \div \frac{6}{4}$ $= \frac{15}{6}$ or $2\frac{1}{2}$
2. Estimate the quotient of two improper fractions or mixed numbers by dividing the whole numbers closest to them. _____	b)
3. Divide two fractions by writing them with a common denominator, and dividing the numerators. _____	c) $5\frac{1}{5} \div 1\frac{2}{3} \approx 5 \div 2$ $\approx \frac{5}{2}$ or $2\frac{1}{2}$
4. Divide a fraction by multiplying by its reciprocal. _____	d) $\frac{3}{5} \div \frac{6}{7} = \frac{3}{5} \times \frac{7}{6}$ $= \frac{21}{30} = \frac{7}{10}$

Practise and Apply

5. Complete the diagrams to determine each quotient.

   a) $\frac{5}{6} \div \frac{1}{3}$

   b) $1\frac{1}{2} \div \frac{3}{4}$

   c) $\frac{1}{3} \div \frac{1}{2}$

   d) $1\frac{3}{4} \div \frac{2}{3}$

6. Divide using a common denominator. Show your thinking.

   a) $\frac{2}{3} \div \frac{5}{6}$

   b) $1\frac{7}{8} \div \frac{3}{4}$

   c) $3\frac{3}{10} \div 2\frac{2}{5}$

   d) $1\frac{2}{3} \div 2\frac{5}{9}$

7. Divide using multiplication.

   a) $\frac{5}{8} \div \frac{2}{3}$

   b) $7 \div 4\frac{2}{3}$

   c) $1\frac{5}{6} \div \frac{7}{12}$

   d) $6\frac{2}{3} \div 2\frac{1}{2}$

8. Estimate, then divide using a common denominator. Show your thinking.

   a) $1\frac{7}{8} \div 1\frac{1}{4}$ Estimate: _____
      Calculate:

   b) $5\frac{7}{10} \div 3\frac{9}{10}$ Estimate: _____
      Calculate:

   c) $2\frac{1}{6} \div 1\frac{5}{12}$ Estimate: _____
      Calculate:

9. Estimate, then divide using multiplication. Show your thinking.

   a) $6\frac{5}{6} \div 3\frac{1}{2}$ Estimate: _____
      Calculate:

   b) $8\frac{1}{3} \div 2\frac{3}{4}$ Estimate: _____
      Calculate:

   c) $7\frac{1}{8} \div 4$ Estimate: _____
      Calculate:

10. Carlos got $\frac{5}{6}$ of the test questions correct. This was 15 questions. How many questions were on the test? Show your thinking.

11. Alisha needed $\frac{3}{4}$ L of gasoline to mow the lawn. There was $3\frac{3}{4}$ L of gasoline in the container. How many times can she mow the lawn before refilling the container? Show your thinking.

12. Jean-Pierre walked $4\frac{1}{2}$ km in $1\frac{1}{4}$ h. If he walked at a steady pace, how fast did he walk in kilometres per hour? Show your thinking.

13. A running track used in competition is $\frac{2}{5}$ km. How many laps is the 1500 m race? Show two ways to solve the problem.

   There are 1000 m in 1 km.
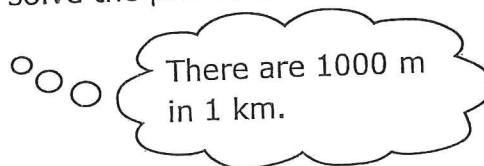
Date:_____

6.6 Notes and Questions: Applying Fractional Operations

<u>Order of Operations</u>:

The order of operations for _____ is the same as for
_____ and _____.

B

E

D

M

A

S

Calculate:

$$\frac{1}{3} \times (9-2) - \frac{5}{6}$$

$$2\frac{1}{4} \times \left(1\frac{3}{4} + 1\frac{1}{4}\right)$$

$$\frac{4}{5} + \frac{2}{3} \times \frac{3}{4} =$$

$$\left(\frac{4}{5} - \frac{1}{2}\right) \div \frac{9}{20} =$$

$$\frac{2}{7}\left(\frac{1}{3} + \frac{3}{4}\right) =$$

$$\frac{4}{5} \times 1\frac{2}{3} - \frac{6}{7} \div \frac{3}{2} =$$

Example #1

Malinda earns $14/h at Safeway. For time worked above 40 h in a week, she earns time-and-a-half. How much does Malinda earn for working 48 h in a week?

Calculate in Stages:	Evaluate One Expression

A Question to try...

Amar is planting a garden to grow his own vegetables and fruit. Three quarters of his garden is made up of vegetables. The rest of his garden is for fruit. One third of the garden for fruit is used to grow strawberries. What fraction of the garden is used to grow strawberries?

Summary of Fraction Operations

Multiplying or dividing a Fraction by a Whole Number is like multiplying fractions because:

When multiplying complete fractions:_____

To multiply mixed numbers you need to: _____

To divide complete fractions:_____

To divide mixed numbers: _____

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6.6 Applying Fraction Operations

MathLinks 8, pages 230–235

Key Ideas Review

1. Circle the correct response to complete each statement.

   a) You need to decide which (operation/manipulation) to perform on fractions to solve problems.

   b) Some fraction problems can involve the (computation/order) of operations.

2. Number the statements to put the operations in the correct order.

   _____ Add and subtract in order from left to right.

   _____ Brackets

   _____ Multiply and divide in order from left to right.

Practise and Apply

3. Circle the first step in calculating the answer, then solve.

   a) $\frac{5}{6} - \frac{1}{3} \times \frac{3}{4}$

   b) $3\frac{1}{2} \div \frac{3}{4} - \left(1\frac{1}{2} + \frac{5}{6}\right)$

   c) $\frac{7}{8} + \frac{2}{3} \div \frac{1}{4}$

   d) $1\frac{1}{2} \times \frac{1}{3} \div \frac{2}{3}$

4. Calculate. Show your thinking.

   a) $3 \div \frac{3}{4} + 5 \times \frac{1}{2}$

   b) $\frac{2}{3} + \frac{1}{6} \times 1\frac{2}{3}$

   c) $\frac{3}{4} \times (12 - 8) - \frac{3}{8}$

   d) $3\frac{7}{10} \div \left(1\frac{3}{10} + 1\frac{9}{10}\right)$

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5. Tracy earns $12 an hour as a cashier in a grocery store. One week she worked 8 hours a day for 5 days. One of these days was a holiday, for which she earned time-and-a-half. How much did Tracy earn that week?

6. Graham saved $1\frac{1}{2}$ bags of Halloween candy to share with two friends. Graham's father asked him to save $\frac{1}{4}$ of a bag for his younger brother. If Graham and his friends each get equal amounts of what is left, how much candy will each of them get?

7. Add one pair of brackets to the left side of each equation to make it true.

a) $\frac{1}{2} + \frac{5}{8} \times \frac{4}{3} + \frac{3}{2} = 3$

b) $1\frac{1}{4} - \frac{1}{8} \div 1\frac{1}{2} - \frac{3}{4} = 1\frac{1}{12}$

c) $\frac{13}{5} - \frac{3}{10} + \frac{7}{10} \div \frac{1}{2} - \frac{3}{5} = 0$

d) $1\frac{1}{4} \times 2\frac{2}{5} \div 2\frac{1}{6} - 1\frac{1}{3} = \frac{2}{39}$

8. Here is a way of using four 3s and the order of operations to write an expression that equals 5.
$$3 - \frac{3}{3} + 3 = 5$$
Use four 3s and the order of operations to write expressions with each of the following values.

a) 0

b) 1

c) 2

d) 3

9. Lake Huron has about 2000 km of shoreline. Lake Superior's shoreline is $\frac{1}{2}$ plus $\frac{1}{5}$ of that distance. Write an expression to determine the length of shoreline in Lake Superior, then solve.

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