

Operations with Fractions

In Unit 5 students deepen their understanding of fractions and develop strategies for adding, subtracting, multiplying, and dividing fractions. The first four lessons focus on adding and subtracting fractions and mixed numbers. In these lessons students realize that fractions and mixed numbers are considerably easier to add and subtract when they have a common denominator. They learn various strategies to find and rewrite fractions with common denominators. They use estimation strategies to assess the reasonableness of their answers, and they reflect on which types of problems can be solved mentally and which cannot. Students look for patterns in their solutions to help them develop rules and shortcuts for solving certain types of problems.

Lessons 5-5 through 5-9 focus on fraction multiplication. Students begin by reviewing the “fraction-of” work they did in previous units. They connect this concept to multiplying a fraction and a whole number. Students then use paper folding and area models to multiply fractions by other fractions. They learn a fraction multiplication algorithm that states that the product of two fractions can be found by multiplying the numerators and multiplying the denominators. For example, $\frac{2}{3} * \frac{4}{5} = \frac{(2 * 4)}{(3 * 5)} = \frac{8}{15}$. In Lesson 5-10 students apply their conceptual understanding of fraction multiplication to solve a real-world problem.

In Lessons 5-11 and 5-12 students further apply their understanding of fraction multiplication. In Grade 4 students learned the multiplication rule for equivalent fractions, which states that multiplying the numerator and denominator by the same number gives a fraction that is equivalent to the original fraction. In this unit they explain why the multiplication rule for equivalent fractions works. They also explain why multiplying one number by a number greater than 1 produces a product greater than the original number, while multiplying a number by a fraction less than 1 produces a product less than the original number. Students then explore fraction multiplication in real-world contexts and write their own fraction multiplication number stories. For example, they might write a story about finding a fraction of something or finding the area of a rectangular object that has fractional side lengths.

Lessons 5-13 and 5-14 introduce fraction division. Students use drawings and other visual models to divide unit fractions (fractions with a 1 in the numerator) by whole numbers, solving problems such as $\frac{1}{2} \div 3 = \frac{1}{6}$. Students also divide whole numbers by unit fractions, solving problems such as $3 \div \frac{1}{2} = 6$. They think about the relationship between multiplication and division to check their work. For example, after solving $3 \div \frac{1}{2} = 6$, students multiply $\frac{1}{2} * 6 = 3$ to check that their division is correct.

Vocabulary

Important terms in Unit 5:

algorithm A set of step-by-step instructions for doing something, such as carrying out a computation or solving a problem.

area model A model for multiplication in which the length and width of a rectangle represent the *factors*, and the area of the rectangle represents the *product*.

common denominator Any nonzero number that is a *multiple* of the denominators of two or more fractions. For example, the fractions $\frac{1}{2}$ and $\frac{2}{3}$ have common denominators 6, 12, 18, and other *multiples* of 6. See also **quick common denominator**.

dimension A measure along one direction of an object, typically length, width, or height. For example, the dimensions of a rectangle might be 2 units by 4 units.

dividend In division, the number that is being divided. For example, in $\frac{1}{2} \div 3 = \frac{1}{6}$, the dividend is $\frac{1}{2}$.

divisor In division, the number that divides another number. For example, in $\frac{1}{2} \div 3 = \frac{1}{6}$, the divisor is 3.

equivalent fractions Fractions that name the same number, such as $\frac{1}{2}$, $\frac{4}{8}$, and $\frac{8}{16}$.

factor of a counting number n A counting number whose *product* with some other counting number equals n . For example, 2 and 3 are factors of 6 because $2 * 3 = 6$.

multiple of a counting number n A *product* of n and a counting number. For example, the multiples of 7 are 7, 14, 21, 28, and so on.

multiplication rule for equivalent fractions

A rule stating that if the numerator and denominator of a fraction are multiplied by the same non-zero number, the result is a fraction that is equivalent to the original fraction.

product The result of multiplying two numbers, called *factors*. For example, in $4 * 3 = 12$, the product is 12.

quick common denominator (QCD) The *product* of the denominators of two or more fractions. For example, the quick common denominator for $\frac{1}{4}$ and $\frac{3}{6}$ is $4 * 6$, or 24.

quotient The result of dividing one number by another number. For example, in $\frac{1}{2} \div 3 = \frac{1}{6}$, the quotient is $\frac{1}{6}$.

unit fraction A fraction whose numerator is 1, such as $\frac{1}{2}$ or $\frac{1}{7}$.

Do-Anytime Activities

To work with your child on the key concepts in this unit, try some of these activities.

1. Have your child solve simple real-world fraction addition and subtraction problems. For example:
This recipe calls for $\frac{3}{4}$ cup of white flour and $\frac{1}{2}$ cup of wheat flour. How much flour do we need in all? How much more white flour do we need than wheat flour?
2. Point out a collection of objects, such as the 20 slices of bread in a loaf. Ask your child to figure out how many slices would be in a fraction of the loaf. For example, what is $\frac{1}{5}$ of 20 slices or $\frac{2}{3}$ of 20 slices?
3. Have your child fold a sheet of paper to find a fraction of a fraction, such as $\frac{1}{2}$ of $\frac{2}{3}$.

Building Skills through Games

In Unit 5 your child will practice strategies for fraction addition, subtraction, multiplication, and division. He or she will also practice concepts and skills from previous units. Detailed instructions for each game are in the *Student Reference Book*. Many of these games can be played at home with materials you likely already have; gameboards can be copied for home use.

Decimal Top-It: Addition or Subtraction See *Student Reference Book*, pages 298 and 299. Two players need number cards 0–9 (4 of each), 4 counters, and a calculator for this game. *Decimal Top-It: Addition or Subtraction* provides practice adding or subtracting decimals.

Fraction Of See *Student Reference Book*, pages 306–307. Two players need *Fraction Of* cards and a *Fraction Of* record sheet from *Math Masters*, page G24 for this game. *Fraction Of* provides practice with multiplying fractions by whole numbers.

Fraction Top-It: Addition See *Student Reference Book*, page 309. Two players need fraction cards for this game. *Fraction Top-It: Addition* provides practice adding fractions.

Fraction/Whole Number Top-It See *Student Reference Book*, page 310. Two to four players need number cards 1–10 (4 of each) and fraction cards for this game. *Fraction/Whole Number Top-It* provides practice multiplying fractions by whole numbers.

Multiplication or Division Top-It: Larger Numbers See *Student Reference Book*, page 325. Two players need number cards 0–9 (4 of each) for these games. *Multiplication* and *Division Top-It: Larger Numbers* provide practice multiplying and dividing multidigit whole numbers.

As You Help Your Child with Homework

As your child brings assignments home, you might want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through this unit's Home Links.

Home Link 5-1

- $\frac{3}{6}, \frac{5}{10}, \frac{4}{6}, \frac{8}{12}, \frac{12}{18}, \frac{9}{12}, \frac{15}{20}$
- $8; \frac{6}{8} - \frac{4}{8} = ?; \frac{2}{8}$
- $6; \frac{1}{6} + \frac{4}{6} = ?; \frac{5}{6}$
- 64,347
- 65,178

Home Link 5-2

- $35; \frac{20}{35}; \frac{21}{35}; <$
 - $20; \frac{5}{20}; \frac{4}{20}; >$
 - $24; \frac{10}{24}; \frac{9}{24}; >$
- $9; \frac{5}{9}; \frac{6}{9}; <$
 - $18; \frac{14}{18}; \frac{15}{18}; <$
 - $\frac{21}{35} - \frac{20}{35} = \frac{1}{35}$

- $\frac{5}{20} + \frac{4}{20} = \frac{9}{20}$
- 108 R70
- $\frac{5}{9} + \frac{6}{9} = \frac{11}{9}$, or $1\frac{2}{9}$
- 17 R9

Home Link 5-3

- $5\frac{5}{6}$
- $8\frac{3}{6}$
- $1\frac{4}{12}$
- $27\frac{9}{10}$
- 3.624
- 14.012
- One and forty-six hundredths
- Four and three hundred nine thousandths

Home Link 5-4

- $8\frac{1}{8} - 4\frac{3}{8} = m; 3\frac{6}{8}$
- $12\frac{3}{4} + 5\frac{1}{3} = m; 18\frac{1}{12}$
- $9\frac{1}{8} - 4\frac{1}{2} = m; 4\frac{5}{8}$
- 128.174
- 1,737.405
- 8.25

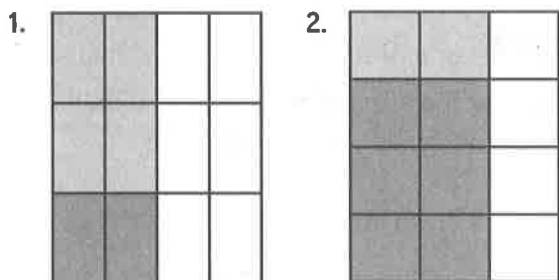
Home Link 5-5

- 4 gallons; $\frac{2}{3} * 6 = 4$
- 12 books; $\frac{4}{5} * 15 = 12$
- 70 miles; $\frac{7}{10} * 100 = 70$
- 18 square feet; $\frac{3}{4} * 24 = 18$
- < 6. < 7. = 8. > 9. > 10. >

Home Link 5-6

- a. 3 b. 12 c. 12
- a. 45 b. $5\frac{5}{8}$ c. $5\frac{5}{8}$ d. $5\frac{5}{8}$
- $7 * \frac{2}{5} = ?; 2\frac{4}{5}$ 4. $24 * \frac{3}{4} = ?; 18$
- 0.9 6. 0.4 7. 7.1 8. 1.48 9. 5.72 10. 3.00

Home Link 5-7



- d. $\frac{2}{12}$ e. $\frac{2}{12}$ d. $\frac{6}{12}$ e. $\frac{6}{12}$
3. 4.79 4. 9.67 5. 10.04

Home Link 5-8

- $\frac{3}{4} \cdot \frac{1}{2} \cdot \frac{3}{8} \cdot \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$ 2. $\frac{1}{3} \cdot \frac{2}{3} \cdot \frac{2}{9} \cdot \frac{1}{3} \times \frac{2}{3} = \frac{2}{9}$
3. 4.31 4. 2.95 5. 2.33

Home Link 5-9

- $\frac{1}{6}$ 2. $\frac{4}{12}$ 3. $\frac{8}{25}$
- $\frac{4}{30}$ 5. $\frac{10}{48}$ 6. $\frac{10}{84}$
- Less than $\frac{2}{3}$ 8. Less than $\frac{6}{10}$
- True 10. False 11. False 12. True
- $\frac{5}{6}$ 14. $\frac{9}{8}$, or $1\frac{1}{8}$ 15. $\frac{13}{20}$

Home Link 5-10

- Sample answers: $\frac{1}{3} * \frac{2}{4} = \frac{2}{12}$; $\frac{2}{4} * \frac{1}{3} = \frac{2}{12}$
- Sample answers: $\frac{3}{4} * \frac{2}{5} = \frac{6}{20}$; $\frac{2}{5} * \frac{3}{4} = \frac{6}{20}$
- $3\frac{6}{8}$ 4. $2\frac{2}{3}$ 5. $7\frac{1}{9}$ 6. $4\frac{7}{12}$

Home Link 5-11

- a. $\frac{4}{4} \cdot \frac{16}{20}$ b. $\frac{6}{6} \cdot \frac{6}{18}$
- a. No. 4. 6 5. 12

Home Link 5-12

- $\frac{8}{3}$, or $2\frac{2}{3}$; Sample answer: Our class ordered 4 kinds of pizza for a celebration. We ate $\frac{2}{3}$ of each pizza. How much pizza did we eat in all?
- 8; Sample answer: There are 16 students playing kickball. Half of them are girls. How many girls are playing kickball?
- 6.82 4. 4.34

Home Link 5-13

- $\frac{1}{2} \div 4 = b; \frac{1}{8}; \frac{1}{2} \div 4 = \frac{1}{8}; \frac{1}{8} * 4 = \frac{4}{8}$, or $\frac{1}{2}$
- $\frac{1}{4} \div 3 = r; \frac{1}{12}; \frac{1}{4} \div 3 = \frac{1}{12}; \frac{1}{12} * 3 = \frac{3}{12}$, or $\frac{1}{4}$
- 22,113 4. 71,568

Home Link 5-14

- $2 \div \frac{1}{8} = b; 16; 2 \div \frac{1}{8} = 16; 16 * \frac{1}{8} = \frac{16}{8} = 2$
- $5 \div \frac{1}{2} = m; 10; 5 \div \frac{1}{2} = 10; 10 * \frac{1}{2} = \frac{10}{2} = 5$
- 77 R7 4. 89 R45

Using Equivalent Fractions to Solve Problems



① Fill in the equivalent fractions in the table below.

	Multiply Both the Numerator and Denominator by:				
Fraction	2	3	4	5	6
$\frac{1}{2}$	$\frac{2}{4}$		$\frac{4}{8}$		$\frac{6}{12}$
$\frac{2}{3}$		$\frac{6}{9}$		$\frac{10}{15}$	
$\frac{3}{4}$	$\frac{6}{8}$		$\frac{12}{16}$		$\frac{18}{24}$

Estimate. Then solve by finding fractions with a common denominator. Write a number sentence to show which fractions you used.

Example: $\frac{1}{3} + \frac{7}{12} = ?$

Estimate: close to 1, because $\frac{1}{3}$ is less than $\frac{1}{2}$, and $\frac{7}{12}$ is a little more than $\frac{1}{2}$

Common denominator: 12 Number sentence: $\frac{4}{12} + \frac{7}{12} = ?$

Answer: $\frac{11}{12}$

② $\frac{6}{8} - \frac{1}{2} = ?$

_____ (estimate)

Common denominator: _____

Number sentence: _____

Answer: _____

③ $\frac{1}{6} + \frac{2}{3} = ?$

_____ (estimate)

Common denominator: _____

Number sentence: _____

Answer: _____

Practice

Estimate. Then solve using U.S. traditional multiplication. Show your work on the back of this page.

④ $723 * 89 =$ _____

Estimate: _____

⑤ $1,207 * 54 =$ _____

Estimate: _____

Using a Common Denominator



- ① For each pair of fractions in the table, find a common denominator. Then rewrite the two fractions as equivalent fractions with a common denominator. Write $>$ or $<$ in the space provided to create a true number sentence.

Remember the three strategies you have learned:

- List equivalent fractions.
- Check to see if one denominator is a multiple of the other denominator.
- Multiply denominators to get a quick common denominator.

	Original Fractions	Common Denominator	Equivalent Fractions	$>$ or $<$
a.	$\frac{4}{7}$			$\frac{4}{7}$ _____ $\frac{3}{5}$
	$\frac{3}{5}$			
b.	$\frac{5}{9}$			$\frac{5}{9}$ _____ $\frac{2}{3}$
	$\frac{2}{3}$			
c.	$\frac{1}{4}$			$\frac{1}{4}$ _____ $\frac{2}{10}$
	$\frac{2}{10}$			
d.	$\frac{7}{9}$			$\frac{7}{9}$ _____ $\frac{5}{6}$
	$\frac{5}{6}$			
e.	$\frac{5}{12}$			$\frac{5}{12}$ _____ $\frac{3}{8}$
	$\frac{3}{8}$			

Use the table to help you rewrite the problems with common denominators. Then solve.

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

③ $\frac{1}{4} + \frac{2}{10} =$ _____ $+$ _____ $=$ _____

④ $\frac{5}{9} + \frac{2}{3} =$ _____ $+$ _____ $=$ _____

Practice

Solve. Show your work on the back of the page.

⑤ $8,170 \div 75 \rightarrow$ _____

⑥ $298 \div 17 \rightarrow$ _____

Adding Fractions and Mixed Numbers

Estimate and then solve. Show your work. Use your estimates to check your answers. **Remember:** Before adding fractions and mixed numbers with different denominators, you must rename one or both fractions so both fractions have a common denominator.



Example: $2\frac{3}{5} + 4\frac{2}{3} = ?$

- Find a common denominator for the fraction parts. The quick common denominator for $\frac{3}{5}$ and $\frac{2}{3}$ is the product of the denominators, $5 * 3$, or 15.
- Use the multiplication rule for equivalent fractions to rename each fraction so both fractions have the common denominator.

$$\begin{array}{r} 2\frac{3}{5} \\ + 4\frac{2}{3} \\ \hline \end{array} \rightarrow \begin{array}{r} 2\frac{9}{15} \\ + 4\frac{10}{15} \\ \hline 6\frac{19}{15} \end{array}$$
- Add.
- Rename the sum. $6\frac{19}{15} = 6 + \frac{15}{15} + \frac{4}{15} = 6 + 1 + \frac{4}{15} = 7 + \frac{4}{15} = 7\frac{4}{15}$

① Estimate: _____

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

② Estimate: _____

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

③ Estimate: _____

$\frac{3}{4} + \frac{7}{12} =$ _____

④ Estimate: _____

$15\frac{1}{2} + 12\frac{2}{5} =$ _____

Practice

Write each decimal using numerals.

⑤ three and six hundred twenty-four thousandths _____

⑥ fourteen and twelve thousandths _____

Write each decimal using words.

⑦ 1.46 _____

⑧ 4.309 _____

Marathon Training

Home Link 5-4

NAME _____

DATE _____

TIME _____

Katie is training to run a marathon. She keeps track of how many miles she runs each day.

Use the information in the table to answer the questions.



Training Day	Number of Miles
1	$8\frac{1}{8}$
2	$4\frac{3}{8}$
3	$12\frac{3}{4}$
4	$5\frac{1}{3}$
5	$9\frac{1}{8}$

- ① How many more miles did Katie run on Day 1 than on Day 2?

Number model: _____

Estimate: _____

Show your work:

Answer: _____ miles

- ② How many miles did Katie run on Day 3 and Day 4 combined?

Number model: _____

Estimate: _____

Show your work:

Answer: _____ miles

- ③ Katie set a goal to run $4\frac{1}{2}$ miles on Day 5. How much farther than her goal did she run?

Number model: _____

Estimate: _____

Show your work:

Answer: _____ miles

Practice

0.501	1,737.405	128.174	25,892.46	8.25
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Choose from the list above. Write the number that has:

- ④ a 7 in the hundredths place. _____

- ⑤ a 5 in the thousandths place. _____

- ⑥ a 2 that is worth 0.2. _____

Fraction-Of Problems



NAME _____

DATE _____

TIME _____

Solve each fraction-of problem. Include a unit in your answer. Then write a multiplication number model for each problem.



- ① Suri made 6 gallons of lemonade to sell at her lemonade stand. In one day she sold $\frac{2}{3}$ of the lemonade. How much lemonade did she sell?

Answer: _____

Number model: _____

- ② Antonio planned to read 15 books over the summer for the library's summer reading challenge. At the end of July he had read $\frac{4}{5}$ of the books. How many books had he read?

Answer: _____

Number model: _____

- ③ Elliot is riding in a 100-mile bike race to raise money for a charity. So far he has completed $\frac{7}{10}$ of the race. How far has Elliot biked?

Answer: _____

Number model: _____

- ④ Erica's garden has an area of 24 square feet. She will use $\frac{3}{4}$ of the space for vegetables and $\frac{1}{4}$ of the space for flowers. How much space will she use for vegetables?

Answer: _____

Number model: _____

Practice

Write $<$, $>$, or $=$ to make true number sentences.

⑤ 0.3 _____ 0.32

⑥ 0.428 _____ 0.43

⑦ 1.68 _____ 1.680

⑧ 2.988 _____ 1.989

⑨ 0.06 _____ 0.006

⑩ 5.64 _____ 5.46

Multiplying Whole Numbers and Fractions

Home Link 5-6

NAME _____

DATE _____

TIME _____



① a. What is $\frac{1}{6}$ of 18? _____

b. What is $\frac{4}{6}$ of 18? _____

c. Fill in the blank to make a true number sentence.

$$18 * \frac{4}{6} = \underline{\hspace{2cm}}$$

② a. What is $15 * 3$? _____

b. What is $45 \div 8$? _____

c. What is $15 * 3 \div 8$? _____

d. Fill in the blank to make a true number sentence.

$$15 * \frac{3}{8} = \underline{\hspace{2cm}}$$

③ The art teacher has 7 bottles of glue that are each $\frac{2}{5}$ full. He combines them so he will have fewer bottles. How many bottles of glue does he have after he combines them?

Number model: _____

Answer: _____ bottles

④ The librarian needs to return 24 books to the shelf. In one hour she finished $\frac{3}{4}$ of the job. How many books has she returned to the shelf so far?

Number model: _____

Answer: _____ books

Practice

For Problems 5–7, round each decimal to the nearest tenth.

⑤ 0.93 _____

⑥ 0.417 _____

⑦ 7.06 _____

For Problems 8–10, round each decimal to the nearest hundredth.

⑧ 1.482 _____

⑨ 5.715 _____

⑩ 2.996 _____

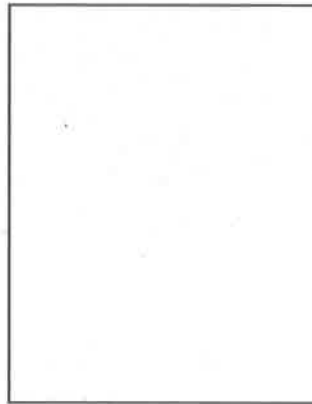
Finding Fractions of Fractions



Follow the directions to solve the problems. You will need two pieces of paper.

① What is $\frac{1}{3}$ of $\frac{2}{4}$?

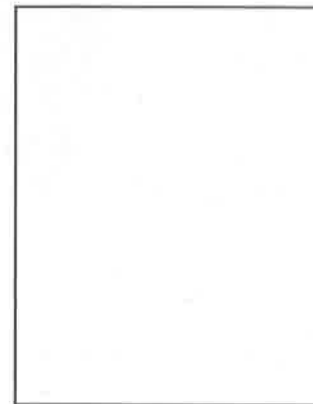
- Fold the paper into fourths. Unfold it and shade two of the fourths.
- Fold the paper into thirds the other way, with the new folds crossing your folds from Part a. Unfold the paper and double-shade one-third of the shaded part.
- Record what your paper looks like.



- How much of the paper is double-shaded? _____
- Fill in the blank: $\frac{1}{3}$ of $\frac{2}{4}$ is _____.

② What is $\frac{3}{4}$ of $\frac{2}{3}$?

- Fold the paper into thirds. Unfold it and shade two of the thirds.
- Fold the paper into fourths the other way, with the new folds crossing your folds from Part a. Unfold the paper and double-shade three-fourths of the shaded part.
- Record what your paper looks like.



- How much of the paper is double-shaded? _____
- Fill in the blank: $\frac{3}{4}$ of $\frac{2}{3}$ is _____.

Practice

Make an estimate. Then solve. Use your estimate to check whether your answer makes sense.

③ _____ (estimate)

$$\begin{array}{r} 1.42 \\ + 3.37 \\ \hline \end{array}$$

④ _____ (estimate)

$$\begin{array}{r} 6.76 \\ + 2.91 \\ \hline \end{array}$$

⑤ _____ (estimate)

$$\begin{array}{r} 5.9 \\ + 4.14 \\ \hline \end{array}$$

Using Area Models to Multiply Fractions



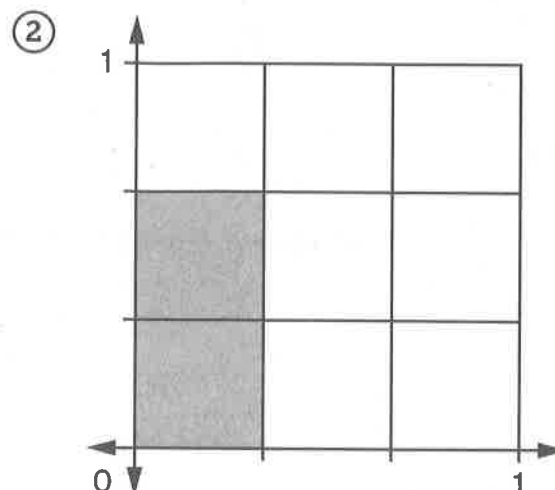
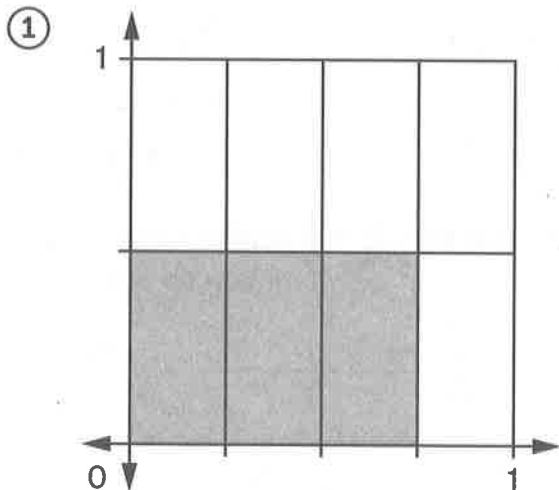
NAME _____

DATE _____

TIME _____



- Label the blank tick marks on the number lines.
- Use the number lines to write the length and width of the shaded rectangle.
- Find the area of the shaded rectangle. (The area of the big square is 1 square unit.)
Think: *Into how many equal parts is the big square divided? How many parts are shaded?*
- Write a multiplication number sentence for the area of the shaded rectangle.



Length of shaded rectangle: _____ unit

Length of shaded rectangle: _____ unit

Width of shaded rectangle: _____ unit

Width of shaded rectangle: _____ unit

Area of shaded rectangle: _____ square unit

Area of shaded rectangle: _____ square unit

Number sentence: _____ \times _____ = _____

Number sentence: _____ \times _____ = _____

Practice

Make an estimate. Then solve. Use your estimate to check whether your answer makes sense.

③ _____
(estimate)

$$\begin{array}{r} 6.75 \\ - 2.44 \\ \hline \end{array}$$

④ _____
(estimate)

$$\begin{array}{r} 5.32 \\ - 2.37 \\ \hline \end{array}$$

⑤ _____
(estimate)

$$\begin{array}{r} 8.6 \\ - 6.27 \\ \hline \end{array}$$

Using an Algorithm to Multiply Fractions

A Fraction Multiplication Algorithm

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

For example: $\frac{2}{3} * \frac{3}{8} = \frac{(2 * 3)}{(3 * 8)} = \frac{6}{24}$



For Problems 1–6, use the algorithm to multiply the fractions.

① $\frac{1}{3} * \frac{1}{2} =$ _____

② $\frac{2}{4} * \frac{2}{3} =$ _____

③ $\frac{4}{5} * \frac{2}{5} =$ _____

④ $\frac{2}{10} * \frac{2}{3} =$ _____

⑤ $\frac{2}{8} * \frac{5}{6} =$ _____

⑥ $\frac{5}{12} * \frac{2}{7} =$ _____

⑦ If you multiply $\frac{2}{3} * \frac{6}{10}$, will the product be more than $\frac{2}{3}$ or less than $\frac{2}{3}$?
How do you know?

⑧ If you multiply $\frac{2}{3} * \frac{6}{10}$, will the product be more than $\frac{6}{10}$ or less than $\frac{6}{10}$?
How do you know?

In Problems 9–12, write true or false. Do not multiply.

⑨ $\frac{3}{4} * \frac{7}{10}$ is less than $\frac{3}{4}$. _____

⑩ $\frac{7}{9} * \frac{11}{12}$ is greater than $\frac{11}{12}$. _____

⑪ $\frac{4}{5} * \frac{2}{8}$ is greater than $\frac{2}{8}$ but less than $\frac{4}{5}$. _____

⑫ $\frac{6}{7} * \frac{1}{4}$ is less than $\frac{6}{7}$ and less than $\frac{1}{4}$. _____

Practice

⑬ $\frac{2}{3} + \frac{1}{6} =$ _____

⑭ $\frac{3}{4} + \frac{3}{8} =$ _____

⑮ $\frac{2}{5} + \frac{1}{4} =$ _____

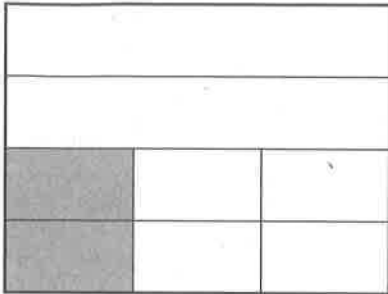
Mystery Models

Write a multiplication number sentence that represents the amount of shaded space in the pictures below. Add to the picture or create a new drawing to represent your number sentence.

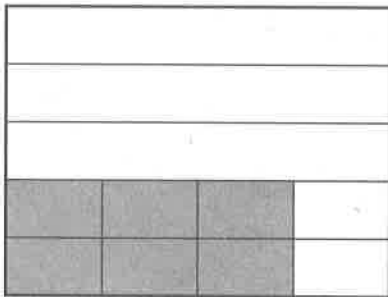
SRB

202

①



②



Practice

Solve.

③ $1\frac{1}{2} + 2\frac{2}{8} = \underline{\hspace{2cm}}$

④ $6 - 3\frac{1}{3} = \underline{\hspace{2cm}}$

⑤ $1\frac{4}{9} + 5\frac{2}{3} = \underline{\hspace{2cm}}$

⑥ $8\frac{1}{3} - 3\frac{3}{4} = \underline{\hspace{2cm}}$

Finding Equivalent Fractions



① a. List three fractions that are equivalent to 1. _____, _____, _____

b. Use the fractions you wrote in Part a to find three fractions equivalent to $\frac{6}{7}$.

Example: $\frac{6}{7} * \frac{10}{10} = \frac{60}{70}$ _____, _____, _____

② You are solving fraction addition problems. Use the information to find equivalent fractions.

a. Original fraction: $\frac{4}{5}$ Denominator needed: 20

Multiply by: _____ Equivalent fraction: _____

b. Original fraction: $\frac{1}{3}$ Denominator needed: 18

Multiply by: _____ Equivalent fraction: _____

③ Addison wanted to find a fraction equivalent to $\frac{3}{8}$ with 16 in the denominator. He thought: "8 * 2 = 16, so I need to multiply $\frac{3}{8}$ by 2." He got an answer of $\frac{3}{16}$.

a. Is $\frac{3}{16}$ equivalent to $\frac{3}{8}$? How do you know?

b. What mistake did Addison make?

Practice

Solve.

④ What is $\frac{2}{3}$ of 9? _____

⑤ What is $\frac{3}{5}$ of 20? _____

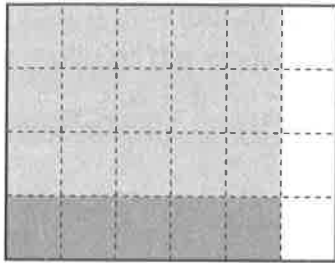
⑥ Explain how you found your answer for Problem 5.

Writing Fraction Multiplication Stories

Solve each multiplication problem. Then write a number story that matches the number sentence and representation.

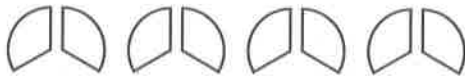


Example: $\frac{1}{4} * \frac{5}{6} = \frac{5}{24}$



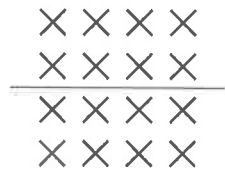
Number Story: Mr. Danielson had a tray of pumpkin bread that was $\frac{5}{6}$ full. After sharing his bread with students, $\frac{1}{4}$ of what he had brought was left. What fraction of the whole tray was left?

① $4 * \frac{2}{3} =$ _____



Number story: _____

② $\frac{1}{2} * 16 =$ _____



Number story: _____

Practice

Make an estimate. Then add or subtract. Show your work on the back of this page.

③ $4.79 + 2.03 = ?$

Estimate: _____

$4.79 + 2.03 =$ _____

④ $8.25 - 3.91 = ?$

Estimate: _____

$8.25 - 3.91 =$ _____

Solving Fraction Division Problems



Write a number model using a letter for the unknown. Solve, showing your solution strategy with representations or drawings. Summarize your work with a division number model. Check your answer using multiplication and write a number sentence to show how you checked.

- ① Ben has $\frac{1}{2}$ of a loaf of bread. If he and his 3 friends share the $\frac{1}{2}$ loaf equally, how much of the whole loaf will each person get?

Number model: _____

Each person will get _____ loaf of bread.

_____ (summary number model) _____ (check using multiplication)

- ② Amanda has a piece of ribbon that is $\frac{1}{4}$ yard long. She wants to share the ribbon with 2 friends so that they can each wear a ribbon for Breast Cancer Awareness Month. If each of the 3 friends gets the same amount, how much ribbon will each person get?

Number model: _____

Each person will get _____ yard of ribbon. _____ (summary number model)

_____ (check using multiplication)

Practice

Make an estimate. Then use U.S. traditional multiplication to solve. Show your work on the back of this page.

- ③ Estimate: _____

$$\begin{array}{r} 567 \\ \times \quad 39 \\ \hline \end{array}$$

- ④ Estimate: _____

$$\begin{array}{r} 3,408 \\ \times \quad 21 \\ \hline \end{array}$$

More Fraction Division Problems



For Problems 1 and 2, write a number model using a letter for the unknown. Solve, showing your solution strategy. Summarize your work with a division number model. Check your answer using multiplication, and write a number sentence to show how you checked.

- ① Charity is packing a 2-pound container of trail mix into bags for a camping trip. Each bag holds $\frac{1}{8}$ pound of trail mix. If Charity uses all 2 pounds of trail mix, how many $\frac{1}{8}$ -pound bags will she have?

Number model: _____

Charity will have _____ $\frac{1}{8}$ -pound bags.

_____ (summary number model)

_____ (check using multiplication)

- ② Davis has a thin box that is 5 inches wide. He wants to use the box to store markers that are $\frac{1}{2}$ -inch wide. If he lines up the markers side by side and uses the entire width of the box, how many markers can Davis fit in the box?

Number model: _____

Davis will be able to fit _____ markers in the box. _____

(summary number model)

_____ (check using multiplication)

Practice

Make an estimate. Then solve. Show your work on the back of this page

③ $623 \div 8 \rightarrow$ _____

Estimate: _____

④ $4,495 \div 50 \rightarrow$ _____

Estimate: _____