Consumable Workbooks  Many of the worksheets contained in the Chapter Resource Masters are available as consumable workbooks in both English and Spanish.

<table>
<thead>
<tr>
<th></th>
<th>MHID</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Study Guide and Intervention Workbook</td>
<td>0-07-881032-9</td>
<td>978-0-07-881032-9</td>
</tr>
<tr>
<td>Skills Practice Workbook</td>
<td>0-07-881031-0</td>
<td>978-0-07-881031-2</td>
</tr>
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<td>Practice Workbook</td>
<td>0-07-881034-5</td>
<td>978-0-07-881034-3</td>
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<tr>
<td>Word Problem Practice Workbook</td>
<td>0-07-881033-7</td>
<td>978-0-07-881033-6</td>
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Spanish Versions

<table>
<thead>
<tr>
<th></th>
<th>MHID</th>
<th>ISBN</th>
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</thead>
<tbody>
<tr>
<td>Study Guide and Intervention Workbook</td>
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<td>978-0-07-881036-7</td>
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<tr>
<td>Skills Practice Workbook</td>
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<td>0-07-881038-8</td>
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</tr>
<tr>
<td>Word Problem Practice Workbook</td>
<td>0-07-881037-X</td>
<td>978-0-07-881037-4</td>
</tr>
</tbody>
</table>

Answers for Workbooks  The answers for Chapter 4 of these workbooks can be found in the back of this Chapter Resource Masters booklet.

StudentWorks Plus™  This CD-ROM includes the entire Student Edition test along with the English workbooks listed above.

TeacherWorks Plus™  All of the materials found in this booklet are included for viewing, printing, and editing in this CD-ROM.

Spanish Assessment Masters (MHID: 0-07-881039-6, ISBN: 978-0-07-881039-8) These masters contain a Spanish version of Chapter 4 Test Form 2A and Form 2C.
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Teacher’s Guide to Using the
Chapter 4 Resource Masters

The Chapter 4 Resource Masters includes the core materials needed for Chapter 4. These materials include worksheets, extensions, and assessment options. The answers for these pages appear at the back of this booklet.

All of the materials found in this booklet are included for viewing and printing on the TeacherWorks Plus™ CD-ROM.

Chapter Resources

**Student-Built Glossary** (pages 1–2)
These masters are a student study tool that presents up to twenty of the key vocabulary terms from the chapter. Students are to record definitions and/or examples for each term. You may suggest that students highlight or star the terms with which they are not familiar. Give this to students before beginning Lesson 4-1. Encourage them to add these pages to their mathematics study notebooks. Remind them to complete the appropriate words as they study each lesson.

**Family Letter and Family Activity** (pages 3–6) The letter informs your students’ families of the mathematics they will be learning in this chapter. The family activity helps them to practice problems that are similar to those on the state test. A full solution for each problem is included. Spanish versions of these pages are also included. Give these to students to take home before beginning the chapter.

**Anticipation Guide** (pages 7–8) This master, presented in both English and Spanish, is a survey used before beginning the chapter to pinpoint what students may or may not know about the concepts in the chapter. Students will revisit this survey after they complete the chapter to see if their perceptions have changed.

Lesson Resources

**Lesson Reading Guide** Get Ready for the Lesson reiterates the questions from the beginning of the Student Edition lesson. Read the Lesson asks students to interpret the context of and relationships among terms in the lesson. Finally, Remember What You Learned asks students to summarize what they have learned using various representation techniques. Use as a study tool for note taking or as an informal reading assignment. It is also a helpful tool for ELL (English Language Learners).

**Study Guide and Intervention** This master provides vocabulary, key concepts, additional worked-out examples and Check Your Progress exercises to use as a reteaching activity. It can also be used in conjunction with the Student Edition as an instructional tool for students who have been absent.

**Skills Practice** This master focuses more on the computational nature of the lesson. Use as an additional practice option or as homework for second-day teaching of the lesson.

**Practice** This master closely follows the types of problems found in the Exercises section of the Student Edition and includes word problems. Use as an additional practice option or as homework for second-day teaching of the lesson.
**Word Problem Practice** This master includes additional practice in solving word problems that apply the concepts of the lesson. Use as an additional practice or as homework for second-day teaching of the lesson.

**Enrichment** These activities may extend the concepts of the lesson, offer a historical or multicultural look at the concepts, or widen students’ perspectives on the mathematics they are learning. They are written for use with all levels of students.

**Graphing Calculator, Scientific Calculator, or Spreadsheet Activities** These activities present ways in which technology can be used with the concepts in some lessons of this chapter. Use as an alternative approach to some concepts or as an integral part of your lesson presentation.

**Assessment Options**

The assessment masters in the *Chapter 4 Resource Masters* offer a wide range of assessment tools for formative (monitoring) and summative (final) assessment.

**Student Recording Sheet** This master corresponds with the Test Practice at the end of the chapter.

**Extended-Response Rubric** This master provides information for teachers and students on how to assess performance on open-ended questions.

**Quizzes** Four free-response quizzes offer assessment at appropriate intervals in the chapter.

**Mid-Chapter Test** This 1-page test provides an option to assess the first half of the chapter. It parallels the timing of the Mid-Chapter Quiz in the Student Edition and includes both multiple-choice and free-response questions.

**Vocabulary Test** This test is suitable for all students. It includes a list of vocabulary words and 10 questions to assess students’ knowledge of those words. This can also be used in conjunction with one of the leveled chapter tests.

**Leveled Chapter Tests**

- **Form 1** contains multiple-choice questions and is intended for use with below grade level students.
- **Forms 2A and 2B** contain multiple-choice questions aimed at on grade level students. These tests are similar in format to offer comparable testing situations.
- **Forms 2C and 2D** contain free-response questions aimed at on grade level students. These tests are similar in format to offer comparable testing situations.
- **Form 3** is a free-response test for use with above grade level students.

All of the above mentioned tests include a free-response Bonus question.

**Extended-Response Test** Performance assessment tasks are suitable for all students. Samples answers and a scoring rubric are included for evaluation.

**Standardized Test Practice** These three pages are cumulative in nature. It includes two parts: multiple-choice questions with bubble-in answer format and short-answer free-response questions.

**Answers**

- The answers for the Anticipation Guide and Lesson Resources are provided as reduced pages with answers appearing in red.
- Full-size answer keys are provided for the assessment masters.
# Student-Built Glossary

This is an alphabetical list of new vocabulary terms you will learn in Chapter 4. As you study the chapter, complete each term’s definition or description. Remember to add the page number where you found the term. Add this page to your math study notebook to review vocabulary at the end of the chapter.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Found on Page</th>
<th>Definition/Description/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>common factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>common multiples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>coordinate plane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>equivalent fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>graph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>greatest common factor (GCF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>improper fraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>least common denominator (LCD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>least common multiple (LCM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mixed number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>multiple</td>
<td></td>
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</tr>
<tr>
<td>Vocabulary Term</td>
<td>Found on Page</td>
<td>Definition/Description/Example</td>
</tr>
<tr>
<td>----------------------</td>
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<td>--------------------------------</td>
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<tr>
<td>ordered pair</td>
<td></td>
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<tr>
<td>origin</td>
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<td>proper fraction</td>
<td></td>
<td></td>
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<tr>
<td>rational number</td>
<td></td>
<td></td>
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<tr>
<td>simplest form</td>
<td></td>
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<td>Venn diagram</td>
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<td>x-axis</td>
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<td>x-coordinate</td>
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<td></td>
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<tr>
<td>y-axis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>y-coordinate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Parent or Guardian:

Using fractions, ratios, and decimals is part of our daily lives. Knowing how to represent and interpret these types of numbers helps us analyze statistics, measure lengths, and compare prices. In order to emphasize the importance of math skills, we try to relate classroom concepts to everyday events.

In Chapter 4, Fractions and Decimals, your child will learn to solve problems by making an organized list, and to find the greatest common factor and least common multiple of numbers to simplify and compare fractions. Your child will also learn to express mixed numbers as improper fractions and to write decimals as fractions and vice versa. Finally, your child will learn about ordered pairs and functions. In the study of this chapter, your child will complete a variety of daily classroom assignments and activities and possibly produce a chapter project.

By signing this letter and returning it with your child, you agree to encourage your child by getting involved. Enclosed is an activity you can do with your child that practices how the math we will be learning in Chapter 4 might be tested. You may also wish to log on to glencoe.com for self-check quizzes and other study help. If you have any questions or comments, feel free to contact me at school.

Sincerely,

Signature of Parent or Guardian _____________________________ Date _________
1. Which of the following choices is the lowest common multiple that can be used to add fractions with denominators of 16, 6, and 8?

\[ \frac{3}{16} + \frac{1}{6} + \frac{5}{8} \]

A 16  
B 32  
C 96  
D 48

Solution

1. Hint: To find the least common multiple, list the multiples of each number until you find a common multiple.

16: 16, 32, 48  
6: 6, 12, 18, 24, 30, 36, 42, 48  
8: 8, 16, 24, 32, 40, 48  
48 is the least common multiple listed.

2. When changed to a decimal, which of the following fractions is written as 0.75?

A \( \frac{1}{2} \)  
B \( \frac{3}{5} \)  
C \( \frac{6}{8} \)  
D \( \frac{1}{4} \)

Solution

2. Hint: In order to change a fraction to a decimal, you divide the numerator (top of the fraction) by the denominator (bottom of the fraction).

A \( 1 \div 2 = 0.5 \)  
B \( 3 \div 5 = 0.6 \)  
C \( 6 \div 8 = 0.75 \)  
D \( 1 \div 4 = 0.25 \)

The answer is D.  
The answer is C.
Estimado padre o apoderado:

El uso de fracciones, razones y decimales es parte de nuestra vida diaria. Saber representar e interpretar este tipo de números nos ayuda a analizar estadísticas, medir longitudes y comparar precios. Para enfatizar la importancia de las destrezas matemáticas, tratamos de relacionar los conceptos del aula con eventos cotidianos.

En el Capítulo 4, Fracciones y decimales, su hijo(a) aprenderá a resolver problemas al enumerarlos de manera organizada; y a hallar el máximo común divisor y el mínimo común múltiplo de los números para simplificar y comparar fracciones. Su hijo(a) también aprenderá a expresar números mixtos en forma de fracciones impropias y a escribir decimales en forma de fracciones y viceversa. Finalmente, su hijo(a) aprenderá sobre pares ordenados y funciones. En el estudio de este capítulo, su hijo(a) completará una variedad de tareas y actividades diarias y es posible que trabaje en un proyecto del capítulo.

Al firmar esta carta y devolverla con su hijo(a), usted se compromete a ayudarlo(a) a participar en su aprendizaje. Junto con esta carta, va incluida una actividad que puede realizar con él(ella) y la cual practica lo que podrían encontrar en las pruebas de los conceptos matemáticos que aprenderán en el Capítulo 4. Además, visiten glencoe.com para ver autocontroles y otras ayudas para el estudio. Si tiene cualquier pregunta o comentario, por favor contácteme en la escuela.

Cordialmente,

Firma del padre o apoderado ______________________________________ Fecha ______
Actividad en familia

Práctica para la prueba estatal

Doblen la página a lo largo de las líneas punteadas. Resuelvan cada problema en otra hoja de papel. Luego, desdoblen la página y revisen las respuestas

1. ¿Cuál de las siguientes opciones es el mínimo común múltiplo que puede usarse para sumar fracciones con denominadores 16, 6 y 8?

\[ \frac{3}{16} + \frac{1}{6} + \frac{5}{8} \]

A 16  
B 32  
C 96  
D 48  

Solución

1. **Ayuda:** Para hallar el mínimo común múltiplo, enumera los múltiplos de cada número hasta encontrar un múltiplo común.

- 16: 16, 32, 48  
- 6: 6, 12, 18, 24, 30, 36, 42, 48  
- 8: 8, 16, 24, 32, 40, 48  

48 es el mínimo común múltiplo enumerado.

La respuesta es **D**.

2. Al escribirse como decimal, ¿cuál de las siguientes fracciones es igual a 0.75?

A \( \frac{1}{2} \)  
B \( \frac{3}{5} \)  
C \( \frac{6}{8} \)  
D \( \frac{1}{4} \)

Solución

2. **Ayuda:** Para cambiar una fracción a decimal, se divide el numerador (parte superior de la fracción) entre el denominador (parte inferior de la fracción).

- A \( 1 \div 2 = 0.5 \)  
- B \( 3 \div 5 = 0.6 \)  
- C \( 6 \div 8 = 0.75 \)  
- D \( 1 \div 4 = 0.25 \)

La respuesta es **C**.
# Anticipation Guide

## Fractions and Decimals

### Before you begin Chapter 4

- Read each statement.
- Decide whether you Agree (A) or Disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (Not Sure).

<table>
<thead>
<tr>
<th>STEP 1 A, D, or NS</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The greatest common factor of two numbers can be found by listing all factors of both numbers.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The greatest common factor of two numbers is always less than both numbers.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Two fractions are equivalent only if their numerators are the same and their denominators are the same.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A fraction is in simplest form only when the greatest common factor of the numerator and denominator is 1.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$\frac{7}{5}$ is an example of a mixed number.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Improper fractions can be rewritten as mixed numbers.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>A multiple of a number is always divisible by the number.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>When comparing two fractions, the greater fraction is always the fraction with the greater denominator.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>To write a fraction as a decimal, divide the denominator into the numerator.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>To write the decimal 0.32 as a fraction, first write 32 over one thousand, then simplify.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Since 8 does not divide evenly into 7, it is not possible to write $\frac{7}{8}$ as a decimal.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>On the coordinate plane, the $x$-axis is horizontal and the $y$-axis is vertical.</td>
<td></td>
</tr>
</tbody>
</table>

### After you complete Chapter 4

- Reread each statement and complete the last column by entering an A (Agree) or a D (Disagree).
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a separate sheet of paper to explain why you disagree. Use examples, if possible.
## Ejercicios preparatorios

### Fracciones y decimales

#### PASO 1

**Antes de comenzar el Capítulo 4**

- Lee cada enunciado.
- Decide si estás de acuerdo (A) o en desacuerdo (D) con el enunciado.
- Escribe A o D en la primera columna O si no estás seguro(a) de la respuesta, escribe NS (No estoy seguro(a)).

<table>
<thead>
<tr>
<th>PASO 1 A, D o NS</th>
<th>Enunciado</th>
<th>PASO 2 A o D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>El máximo común divisor de dos números puede encontrarse enumerando todos los factores de ambos números.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>El máximo común divisor de dos números siempre es menor que ambos números.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Dos fracciones son equivalentes sólo si sus numeradores son iguales y sus denominadores son iguales.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Una fracción está en forma reducida sólo cuando el máximo común divisor del numerador y del denominador es 1.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>$\frac{7}{5}$ es un ejemplo de un número mixto.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Las fracciones impropias pueden volver a plantearse como números mixtos.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>El múltiplo de un número es siempre divisible entre el número.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Cuando se comparan dos fracciones, la fracción mayor es siempre la fracción con el mayor denominador.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Para escribir una fracción como decimal, divide el numerador entre el denominador.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Para escribir el decimal 0,32 como una fracción, primero escribe 32 sobre mil y luego reduce.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Como 8 no se divide uniformemente entre 7, no es posible escribir $\frac{7}{8}$ como decimal.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>En el plano de coordenadas, el eje $x$ es horizontal y el $y$ es vertical.</td>
<td></td>
</tr>
</tbody>
</table>

#### PASO 2

**Después de completar el Capítulo 4**

- Vuelve a leer cada enunciado y completa la última columna con una A o una D.
- ¿Cambió cualquiera de tus opiniones sobre los enunciados de la primera columna?
- En una hoja de papel aparte, escribe un ejemplo de por qué estás en desacuerdo con los enunciados que marcaste con una D.
Lesson Reading Guide

Greatest Common Factor

Get Ready for the Lesson

Read the introduction at the top of page 197 in your textbook. Write your answers below.

1. Who participated in swimming only?

2. Who participated in crafts only?

3. Who participated in both swimming and crafts?

Read the Lesson

4. Look at the diagram at the top of page 197 in your textbook. What does a Venn diagram do?

For Exercises 5–8, use the Venn diagram in Example 2 at the top of page 198.

5. What elements are listed in the circle on the left?

6. What does the name tell you about each of the numbers inside the circle on the left?

7. What does the area where the two circles overlap represent?

8. What does GCF mean and what is the GCF of 60 and 54?

Remember What You Learned

9. Work with a partner to find the GCF for these two sets of numbers: 12 and 13, and 14 and 42. Have one partner find each GCF by listing factors. Have the other partner find each GCF by using prime factors. Then exchange papers and check each other’s work.
The greatest common factor (GCF) of two or more numbers is the greatest of the common factors of the numbers. To find the GCF, you can make a list or use prime factors.

**Example 1**  Find the GCF of 12 and 30.

Make an organized list of the factors for each number.

12: \(1 \times 12, 2 \times 6, 3 \times 4\)
30: \(1 \times 30, 2 \times 15, 3 \times 10, 5 \times 6\)

The common factors are 1, 2, 3, and 6. The greatest is 6. The GCF of 12 and 30 is 6.

**Example 2**  Find the GCF of 18 and 27 by using prime factors.

Write the prime factorizations of 18 and 27.

\[
\begin{align*}
18 & = 2 \cdot 3 \cdot 3 \\
27 & = 3 \cdot 3 \cdot 3
\end{align*}
\]

The common prime factors are 3 and 3. So, the GCF of 18 and 27 is \(3 \times 3\) or 9.

**Exercises**

Find the GCF of each set of numbers by making a list.

1. 8 and 12
2. 10 and 15
3. 81 and 27

Find the GCF of each set of numbers by using prime factors.

4. 15 and 20
5. 6 and 12
6. 28 and 42

Find the GCF of each set of numbers.

7. 21 and 9
8. 15 and 7
9. 54 and 81

10. 30 and 45
11. 44 and 55
12. 35, 20, and 15
Lesson 4–1

NAME ______________________ DATE ______________ PERIOD ______

Chapter 4

4-1

Skills Practice

Greatest Common Factor

Identify the common factors of each set of numbers.
1. 12 and 20
2. 24 and 30
3. 18 and 27
4. 10 and 25
5. 6 and 21
6. 14 and 42

Find the GCF of each set of numbers.
7. 15 and 40
8. 16 and 36
9. 12 and 54
10. 24 and 64
11. 39 and 26
12. 35 and 63
13. 36 and 48
14. 35 and 28
15. 40 and 56
16. 56 and 14
17. 27 and 63
18. 88 and 66
19. 60 and 84
20. 45 and 90
21. 85 and 51
22. 54 and 72
23. 48 and 80
24. 63 and 108
25. 21, 30, 44
26. 16, 24, 56
27. 27, 54, 81
Identify the common factors of each set of numbers.

1. 12 and 20
2. 12, 24, 36
3. 15, 33, 45

Find the GCF of each set of numbers.

4. 12 and 30
5. 50 and 40
6. 20 and 27

7. 28, 42, 56
8. 14, 56, 63
9. 9, 21, 60

Find three numbers whose GCF is the indicated value.

10. 3
11. 16
12. 18

TOYS For Exercises 13 and 14, use the following information.

A store is organizing toys into bins. The toys must be put into bins such that each bin contains the same number of toys without mixing the toys.

<table>
<thead>
<tr>
<th>Toys to Place in Bins</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toy</strong></td>
</tr>
<tr>
<td>airplanes</td>
</tr>
<tr>
<td>boats</td>
</tr>
<tr>
<td>cars</td>
</tr>
</tbody>
</table>

13. What is the greatest number of toys that can be put in a bin?

14. How many bins are needed for each type of toy?
## Word Problem Practice

### Greatest Common Factor

1. **WAREHOUSE** A warehouse has three shelves that can hold 8, 12, or 16 skateboards. Each shelf has sections holding the same number of skateboards. What is the greatest number of skateboards that can be put in a section? Explain.

2. **FRUIT** Mei has 15 oranges, 9 peaches, and 18 pears. She wants to put all of the fruit into decorative baskets. Each basket must have the same number of pieces of fruit in it. Without mixing fruits, what is the greatest number of pieces of fruit Mei can put in each basket? Explain.

3. **SHIPPING** Oscar needs to ship 14 rock CDs, 12 classical CDs, and 8 pop CDs. He can pack only one type of CD in each box, and he must pack the same number of CDs in each box. What is the greatest number of CDs Oscar can pack in each box? Explain.

4. **GARDENING** Jill wants to put 45 sunflower plants, 81 corn plants, and 63 tomato plants in her garden. If she puts the same number of plants in each row and if each row has only one type of plant, what is the greatest number of plants Jill can put in one row? Explain.

5. **MONEY** The list shows the amounts of money the club leader collected from members for a camping trip. Each member paid the same amount. What is the most the camping trip could cost per member? Explain.

<table>
<thead>
<tr>
<th>Day</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td>$36</td>
</tr>
<tr>
<td>Thursday</td>
<td>$54</td>
</tr>
<tr>
<td>Friday</td>
<td>$72</td>
</tr>
</tbody>
</table>

6. **MONEY** Use the information from Exercise 5. How many members have paid to go on the camping trip if the price is the greatest possible price per member?
GCFs By Successive Division

Here is a different way to find the greatest common factor (GCF) of two numbers. This method works well for large numbers.

Find the GCF of 848 and 1,325.

**Step 1** Divide the smaller number into the larger.

\[
\begin{array}{c}
848 \div 1,325 \\
\hline
1 \text{ R} 477 \\
848 \\
\hline
477
\end{array}
\]

**Step 2** Divide the remainder into the divisor.

Repeat this step until you get a remainder of 0.

\[
\begin{array}{c}
477 \div 848 \\
\hline
1 \text{ R} 371 \\
371 \\
\hline
371
\end{array}
\]

\[
\begin{array}{c}
848 \div 371 \\
\hline
2 \text{ R} 106 \\
106 \\
\hline
106
\end{array}
\]

\[
\begin{array}{c}
371 \div 106 \\
\hline
3 \text{ R} 53 \\
53 \\
\hline
53
\end{array}
\]

**Step 3** The last divisor is the GCF of the two original numbers.

The GCF of 848 and 1,325 is 53.

Use the method above to find the GCF for each pair of numbers.

1. 187; 578
2. 161; 943
3. 215; 1,849
4. 453; 484
5. 432; 588
6. 279; 403
7. 1,325; 3,498
8. 9,840; 1,751
9. 3,484; 5,963
10. 1,802; 106
11. 45,787; 69,875
12. 35,811; 102,070
Lesson 4–2

Get Ready for the Lesson

Read the introduction at the top of page 204 in your textbook. Write your answers below.

1. How many kittens are at the pet store?

2. How many Siamese kittens are there?

Read the Lesson

3. The word **equivalent** [ih-KWIH-vuh-luhnt] means “equal in quantity, strength, value, and so forth.” What are equivalent fractions?

4. How can you find equivalent fractions?

5. Which of the following fractions are equivalent? How can you tell?

\[
\frac{5}{9}, \frac{15}{27}, \frac{20}{45}
\]

6. How can you tell if a fraction is in simplest form?

7. What are two ways you can use to write a fraction in simplest form?

Remember What You Learned

8. Look at the table at the top of page 204 in your textbook. Write a fraction that shows how many of the total number of kittens found at a local pet store are Persian. Write an equivalent fraction that uses greater numbers. Write the fraction in simplest form. Be sure to show all your work.
4-2

Study Guide and Intervention

Simplifying Fractions

Fractions that have the same value are equivalent fractions. To find equivalent fractions, you can multiply or divide the numerator and denominator by the same nonzero number.

Example 1  Replace the ● with a number so that \( \frac{1}{2} = \frac{●}{10} \).

Since \( 2 \times 5 = 10 \), multiply the numerator and denominator by 5.

\[
\begin{align*}
\frac{1}{2} & = \frac{●}{10} \\
\times 5 & \quad \times 5
\end{align*}
\]

When the GCF of the numerator and denominator is 1, the fraction is in simplest form. To write a fraction in simplest form, you can divide the numerator and denominator by the GCF.

Example 2  Write \( \frac{12}{30} \) in simplest form.

The GCF of 12 and 30 is 6.

\[
\begin{align*}
\div 6 & \quad \div 6 \\
12 & = 2 \\
30 & = 5
\end{align*}
\]

The GCF of 2 and 5 is 1, so \( \frac{2}{5} \) is in simplest form.

Exercises

Replace each ● with a number so the fractions are equivalent.

1. \( \frac{1}{5} = \frac{●}{15} \)  
   2. \( \frac{12}{18} = \frac{2}{●} \)  
   3. \( \frac{●}{14} = \frac{27}{42} \)

Write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.

4. \( \frac{6}{30} \)  
   5. \( \frac{2}{3} \)  
   6. \( \frac{6}{8} \)

7. \( \frac{21}{28} \)  
   8. \( \frac{15}{30} \)  
   9. \( \frac{7}{10} \)
4-2  Skills Practice

Simplifying Fractions

Replace each \( \bullet \) with a number so the fractions are equivalent.

1. \( \frac{1}{5} = \frac{\bullet}{35} \)
2. \( \frac{2}{15} = \frac{\bullet}{5} \)
3. \( \frac{1}{6} = \frac{\bullet}{24} \)

4. \( \frac{10}{15} = \frac{2}{\bullet} \)
5. \( \frac{4}{\bullet} = \frac{20}{45} \)
6. \( \frac{1}{\bullet} = \frac{4}{16} \)

7. \( \frac{1}{3} = \frac{27}{\bullet} \)
8. \( \frac{7}{\bullet} = \frac{8}{28} \)
9. \( \frac{18}{24} = \frac{\bullet}{4} \)

Write each fraction in simplest form. If the fraction is already in simplest form, write **simplest form**.

10. \( \frac{1}{2} \)
11. \( \frac{8}{10} \)
12. \( \frac{20}{60} \)

13. \( \frac{6}{15} \)
14. \( \frac{15}{60} \)
15. \( \frac{7}{8} \)

16. \( \frac{27}{81} \)
17. \( \frac{7}{12} \)
18. \( \frac{28}{36} \)

19. \( \frac{90}{100} \)
20. \( \frac{8}{21} \)
21. \( \frac{14}{35} \)

22. \( \frac{23}{46} \)
23. \( \frac{9}{13} \)
24. \( \frac{12}{27} \)

25. \( \frac{4}{12} \)
26. \( \frac{75}{100} \)
27. \( \frac{60}{110} \)

28. \( \frac{10}{25} \)
29. \( \frac{15}{19} \)
30. \( \frac{20}{28} \)

31. \( \frac{49}{56} \)
32. \( \frac{49}{70} \)
33. \( \frac{24}{64} \)
Practice
Simplifying Fractions

Replace each \( \cdot \) with a number so the fractions are equivalent.

1. \( \frac{1}{3} = \frac{\cdot}{9} \)
2. \( \frac{1}{4} = \frac{\cdot}{16} \)
3. \( \frac{\cdot}{2} = \frac{8}{16} \)
4. \( \frac{\cdot}{8} = \frac{9}{24} \)

5. \( \frac{1}{2} = \frac{16}{\cdot} \)
6. \( \frac{\frac{12}{21}}{\cdot} = \frac{4}{\cdot} \)
7. \( \frac{\frac{30}{36}}{\cdot} = \frac{6}{\cdot} \)
8. \( \frac{\frac{28}{42}}{\cdot} = \frac{\cdot}{3} \)

Write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.

9. \( \frac{7}{28} \)
10. \( \frac{9}{15} \)
11. \( \frac{10}{42} \)
12. \( \frac{\frac{12}{42}}{\cdot} \)
13. \( \frac{17}{28} \)
14. \( \frac{24}{64} \)

Write two fractions that are equivalent to the given fraction.

15. \( \frac{\frac{3}{10}}{\cdot} \)
16. \( \frac{7}{13} \)
17. \( \frac{\frac{15}{33}}{\cdot} \)

18. ANIMALS In Ms Reyes’ class, 4 out of the 30 students had guinea pigs as pets. Express this fraction in simplest form.

19. ANALYZE GRAPHS The bar graph shows the number of titles held by the top seven women Wimbledon tennis champions. In simplest form, what fraction of the number of titles is held by Steffi Graf?
For Exercises 1–3, use the following information and the table at the right. Write your answers in simplest form.

In a frequency table, the relative frequency of a category is the fraction of the data that falls in that class.

To find relative frequency, divide the frequency by the total number of items.

<table>
<thead>
<tr>
<th>Color</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **STATISTICS** What is the relative frequency of people with brown eyes?

2. **STATISTICS** What is the relative frequency of people with hazel eyes?

3. **STATISTICS** What is the relative frequency of people with brown or hazel eyes?

4. **ANIMALS** Lions sleep about 20 hours a day. Write $\frac{20}{24}$ as a fraction in simplest form.

5. **MARBLES** Carlota has 63 marbles. Twenty-eight of her marbles are aggies. What fraction of Carlota’s marbles are aggies? Write the answer in simplest form.

6. **MOVIES** Fourteen of the top thirty all-time grossing children’s films were animated films. Write $\frac{14}{30}$ as a fraction in simplest form.
4-2  Enrichment

Fraction Mysteries

Here is a set of mysteries that will help you sharpen your thinking skills. In each exercise, use the clues to discover the identity of the mystery fraction.

1. My numerator is 6 less than my denominator.
   I am equivalent to $\frac{3}{4}$.

2. My denominator is 5 more than twice my numerator.
   I am equivalent to $\frac{1}{3}$.

3. The GCF of my numerator and denominator is 3.
   I am equivalent to $\frac{2}{5}$.

4. The GCF of my numerator and denominator is 5.
   I am equivalent to $\frac{4}{6}$.

5. My numerator and denominator are prime numbers.
   My numerator is one less than my denominator.

6. My numerator and denominator are prime numbers.
   The sum of my numerator and denominator is 24.

7. My numerator is divisible by 3.
   My denominator is divisible by 5.
   My denominator is 4 less than twice my numerator.

8. My numerator is divisible by 3.
   My denominator is divisible by 5.
   My denominator is 3 more than twice my numerator.

9. My numerator is a one-digit prime number.
   My denominator is a one-digit composite number.
   I am equivalent to $\frac{8}{32}$.

10. My numerator is a prime number.
    The GCF of my numerator and denominator is 2.
    I am equivalent to $\frac{1}{5}$.

11. **Challenge** Make up your own mystery like the ones above. Be sure that there is only one solution. To check, have a classmate solve your mystery.
4-2  

**TI-73 Activity**

**Simplifying Fractions**

Use the simplification key, \( \text{SIMP} \), on your calculator to help simplify fractions.

**Example**  
Write \( \frac{24}{36} \) in simplest form.

**Method A**

**Step 1**  
Turn on \( \text{mansimp} \).

**Step 2**  
Enter the fraction.

**Step 3**  
The arrow pointing down shows that this fraction can be simplified.

**Step 4**  
Repeat Step 3 as many times as needed until the fraction is in simplest form.

**Method B**

You can enter the factor yourself. Choose a number that divides both the numerator and the denominator. (If you choose a number that does not divide them both, the fraction will *not* change.)

Enter the fraction. Press \( \text{SIMP} \). Enter a factor.

Use either method to write each fraction in simplest form.

1. \( \frac{20}{24} \)  
2. \( \frac{64}{80} \)  
3. \( \frac{50}{75} \)

4. \( \frac{21}{35} \)  
5. \( \frac{150}{350} \)  
6. \( \frac{54}{81} \)
Lesson Reading Guide

Mixed Numbers and Improper Fractions

Get Ready for the Lesson

Complete the Mini Lab at the top of page 209 in your textbook. Write your answers below.

1. How many shaded $\frac{1}{4}$s are there?

2. What fraction is equivalent to $1\frac{1}{4}$?

Make a model to show each number.

3. the number of thirds in $2\frac{2}{3}$.

4. the number of halves in $4\frac{1}{2}$

Read the Lesson

5. What is a mixed number? Write three examples.

6. You read $4\frac{1}{6}$ as four and one-sixth. How do you read the following mixed numbers: $3\frac{3}{5}$, $2\frac{2}{3}$, $8\frac{1}{2}$?

7. What is an improper fraction? Write three examples.

Remember What You Learned

8. Work with a partner. Have one person show the other how to write a mixed number as an improper fraction. Then have the other partner show how to write an improper fraction as a mixed number.
4-3 Study Guide and Intervention

Mixed Numbers and Improper Fractions

The number $2\frac{2}{3}$ is a mixed number. A **mixed number** indicates the sum of a whole number and a fraction. The number $\frac{5}{3}$ is an improper fraction. **Improper fractions** have values that are greater than or equal to 1. Mixed numbers can be written as mixed numbers or as improper fractions.

**Example 1** Write $2\frac{1}{3}$ as an improper fraction.

$$2\frac{1}{3} \rightarrow 2 \times \frac{3}{3} + \frac{1}{3} = \frac{7}{3}$$

Think: $2 \times 3 = 6$ and $6 + 1 = 7$

Check: Use a model.

![Model of $\frac{7}{3}$]

$$\frac{7}{3} = 2 + \frac{1}{3} \text{ or } 2\frac{1}{3} \checkmark$$

**Example 2** Write $\frac{9}{4}$ as a mixed number.

Divide 9 by 4. Use the remainder as the numerator of the fraction.

$$\frac{9}{4} = 2 \frac{1}{4}$$

So, $\frac{9}{4}$ can be written as $2\frac{1}{4}$.

**Exercises**

Write each mixed number as an improper fraction.

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

5. $2\frac{1}{9}$
6. $3\frac{7}{10}$
7. $2\frac{3}{8}$
8. $1\frac{3}{4}$

Write each improper fraction as a mixed number or a whole number.

9. $\frac{7}{4}$
10. $\frac{5}{3}$
11. $\frac{3}{2}$
12. $\frac{11}{8}$

13. $\frac{22}{5}$
14. $\frac{215}{15}$
15. $\frac{25}{4}$
16. $\frac{16}{3}$
4-3
Skills Practice

Mixed Numbers and Improper Fractions

Draw a model for each mixed number. Then write the mixed number as an improper fraction.

1. \(4\frac{1}{3}\)

2. \(3\frac{3}{8}\)

3. \(2\frac{2}{5}\)

Write each mixed number as an improper fraction.

4. \(6\frac{1}{2}\)

5. \(1\frac{5}{6}\)

6. \(1\frac{3}{8}\)

7. \(3\frac{1}{3}\)

8. \(3\frac{7}{8}\)

9. \(2\frac{1}{4}\)

10. \(2\frac{8}{9}\)

11. \(4\frac{5}{6}\)

12. \(8\frac{3}{5}\)

13. \(5\frac{4}{7}\)

14. \(10\frac{2}{3}\)

15. \(9\frac{1}{4}\)

Write each improper fraction as a mixed number or a whole number.

16. \(\frac{9}{5}\)

17. \(\frac{5}{2}\)

18. \(\frac{15}{4}\)

19. \(\frac{17}{8}\)

20. \(\frac{19}{6}\)

21. \(\frac{4\frac{27}{27}}{27}\)

22. \(\frac{25}{2}\)

23. \(\frac{31}{7}\)

24. \(\frac{52}{9}\)

25. \(\frac{41}{3}\)

26. \(\frac{37}{5}\)

27. \(\frac{77}{8}\)
Write each mixed number as an improper fraction.

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

5. $6\frac{1}{4}$
6. $5\frac{3}{5}$
7. $8\frac{1}{9}$
8. $6\frac{3}{4}$

9. **SNAKES** The garden snake that Fumiko measured was $7\frac{3}{4}$ inches long. Write the length as an improper fraction.

10. Express *four and seven eighths* as an improper fraction.

Write each improper fraction as a mixed number or a whole number.

11. $\frac{13}{4}$
12. $\frac{11}{10}$
13. $\frac{10}{3}$

14. $\frac{23}{7}$
15. $\frac{6\frac{14}{14}}{14}$
16. $\frac{8}{8}$

17. **TREES** A nursery is growing trees. Find the height of each tree in terms of feet. Write your answer as a mixed number in simplest form.

<table>
<thead>
<tr>
<th>Trees in Nursery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Apricot</td>
</tr>
<tr>
<td>Peach</td>
</tr>
<tr>
<td>Pear</td>
</tr>
<tr>
<td>Plum</td>
</tr>
</tbody>
</table>
### Word Problem Practice

**Mixed Numbers and Improper Fractions**

1. **MILEAGE** Brownsville is $7\frac{5}{8}$ miles away from Frisco. Write the distance as an improper fraction.

2. **SWIMMING** Steven swam $\frac{47}{6}$ meters crossing Lady Jay Creek. Write the distance he swam as a mixed number.

3. **FOOD** Kenji’s favorite recipe calls for $3\frac{3}{4}$ cups of flour. Write the amount of flour he needs as an improper fraction.

4. **PUPPY** Nikki’s puppy weighs $\frac{25}{7}$ pounds. Write the puppy’s weight as a mixed number.

5. **EXERCISE** Koto can run $4\frac{7}{10}$ miles before she is too tired to keep going. Write the distance she can run as an improper fraction.

6. **GEOGRAPHY** Hampshire Hill is $\frac{87}{9}$ meters tall. Write its height as a mixed number.
Recipes

It is common to see mixed fractions in recipes. A recipe for a pizza crust may ask for \(1\frac{1}{2}\) cups of flour. You could measure this amount in two ways. You could fill a one-cup measuring cup with flour and a one-half-cup measuring cup with flour or you could fill a half-cup measuring cup three times, because \(1\frac{1}{2}\) is the same as \(3\).

In the following recipes, some mixed numbers have been changed to improper fractions and other fractions may not be written in simplest form. Rewrite each recipe as you would expect to find it in a cookbook.

<table>
<thead>
<tr>
<th>Quick Pizza Crust</th>
<th>Apple Crunch</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{3}{2}) cups flour</td>
<td>(\frac{3}{2}) cups white sugar</td>
</tr>
<tr>
<td>(\frac{2}{4}) cup water</td>
<td>(\frac{3}{2}) cups brown sugar</td>
</tr>
<tr>
<td>(\frac{9}{4}) teaspoons yeast</td>
<td>(\frac{4}{2}) cups of flour</td>
</tr>
<tr>
<td>(\frac{2}{2}) teaspoon salt</td>
<td>(\frac{4}{2}) cups oatmeal</td>
</tr>
<tr>
<td>(\frac{4}{4}) teaspoon sugar</td>
<td>(\frac{8}{3}) sticks margarine</td>
</tr>
<tr>
<td>(\frac{8}{8}) tablespoon oil</td>
<td>(\frac{2}{2}) teaspoon salt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Granola</th>
<th>Chocolate Treats</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{4}{3}) cups sesame seeds</td>
<td>(\frac{4}{6}) cup butter</td>
</tr>
<tr>
<td>(\frac{4}{2}) cups coconut</td>
<td>(\frac{9}{4}) cups brown sugar</td>
</tr>
<tr>
<td>(\frac{3}{2}) cups sunflower seeds</td>
<td>(\frac{6}{2}) eggs</td>
</tr>
<tr>
<td>(\frac{8}{2}) cups rolled oats</td>
<td>(\frac{11}{4}) cups flour</td>
</tr>
<tr>
<td>(\frac{2}{2}) cup honey</td>
<td>(\frac{5}{2}) teaspoons baking powder</td>
</tr>
<tr>
<td>(\frac{4}{4}) tablespoon brown sugar</td>
<td>(\frac{6}{3}) cups chocolate chips</td>
</tr>
</tbody>
</table>
Example 1  ELECTIONS  Tyler, McKayla, and Kareem are running for student council office. The three positions they could be elected for are president, treasurer, and secretary. How many possible ways could the three of them be elected?

Understand  You know that there are three positions and three students to fill the positions. You need to know the number of possible arrangements for them to be elected.

Plan  Make a list of all the different possible arrangements. Use T for Tyler, M for McKayla, and K for Kareem.

Solve

<table>
<thead>
<tr>
<th>President</th>
<th>T</th>
<th>T</th>
<th>K</th>
<th>K</th>
<th>M</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasurer</td>
<td>M</td>
<td>K</td>
<td>M</td>
<td>T</td>
<td>T</td>
<td>K</td>
</tr>
<tr>
<td>Secretary</td>
<td>K</td>
<td>M</td>
<td>T</td>
<td>M</td>
<td>K</td>
<td>T</td>
</tr>
</tbody>
</table>

Check  Check the answer by seeing if each student is accounted for in each situation.

Exercise  SHOPPING  Khuan has to stop by the photo store, the gas station, the grocery store, and his grandmother’s house. How many different ways can Khuan make the stops?
Solve. Use the make an organized list strategy.

1. BACKPACKS  A department store sells three different styles of backpacks. Each style comes in navy, black, or red. How many different backpacks are available?

2. MUSIC  A popular band has two of their concerts each available on tape, CD, DVD, and VHS. How many different items do they have available for these two concerts?

3. MANUFACTURING  A candle factory makes 8 different candle scents available in a votive candle, pillar candle, or jar candle. How many combinations of scent and type of candle are possible?

4. AWARD CEREMONY  For an awards ceremony, the school principal, vice principal, athletic director, and student council president are all sitting on the stage. How many arrangements are there for all of them to sit on the stage?
Use the make an organized list strategy to solve Exercises 1 and 2.

1. **FLAGS** Randy wants to place the flag of each of 3 countries in a row on the wall for an international fair. How many arrangements are possible?

2. **KITES** A store sells animal kites, box kites, and diamond kites in four different colors. How many combinations of kite type and color are possible?

Use any strategy to solve Exercises 3–7. Some strategies are shown below.

<table>
<thead>
<tr>
<th>Problem-Solving Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Make a table.</td>
</tr>
<tr>
<td>• Guess and check.</td>
</tr>
</tbody>
</table>

3. **SHIRTS** A mail-order company sells 4 styles of shirts in 6 different colors. How many combinations of style and color are possible?

4. **PATTERNS** If the pattern continues, how many small squares are in the fifth figure of this pattern?

5. **FOOD** Is $6 enough money to buy a head of lettuce for $0.99, two pounds of tomatoes for $2.38, and two pounds of avocados for $2.78?

6. **MONEY** Nikki earns $45 a week pet sitting. How much does she earn each year?

7. **WRITING** The number of magazine articles Nora sold in her first four years is shown. At this rate, how many articles will she sell in the fifth year?

<table>
<thead>
<tr>
<th>Year</th>
<th>Number Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
</tr>
</tbody>
</table>
4-4 Word Problem Practice

Problem-Solving Investigation: Make an Organized List

1. GEOMETRY Find the difference in the areas of the square and rectangle.

\[
\begin{align*}
\text{Square:} & \quad 6 \times 6 = 36 \\
\text{Rectangle:} & \quad 8 \times 3 = 24
\end{align*}
\]

2. ICE CREAM Meagan is taking the kids she is babysitting to the local ice cream parlor. If she has $7, does she have enough money for two ice cream sandwiches, one sundae, and one scoop of ice cream?

<table>
<thead>
<tr>
<th>Ice Cream Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>One scoop</td>
</tr>
<tr>
<td>Two scoops</td>
</tr>
<tr>
<td>Ice cream sandwich</td>
</tr>
<tr>
<td>Ice cream sundae</td>
</tr>
</tbody>
</table>

3. FUND-RAISER The school band is selling cookie dough for a fund-raiser. A tub of cookie dough sells for $12, a pack of dry cookie mix sells for $5, and drop cookie dough sells for $15 a pack. If the school band sells 24 tubs, 15 dry mixes, and 30 packs of drop cookie dough, how much money will they collect?

4. SHOPPING At a sports store, Curtis bought some baseball card packs and some T-shirts. The baseball card packs cost $3 each and the T-shirts cost $8 each. If Curtis spent $30, how many baseball card packs and how many T-shirts did he buy?

5. LANGUAGE ARTS On Monday, 86 science fiction books were sold at a book sale. This is 8 more than twice the amount sold on Thursday. How many science fiction books were sold on Thursday?

6. PATTERNS What number is missing in the pattern . . , 234, 345, ___, 567, . . ?
4-5 Lesson Reading Guide

Least Common Multiple

Get Ready for the Lesson
Read the introduction at the top of page 216 in your textbook.
Write your answers below.

1. Which of the products of 2 are the products of 3?

2. Find the least number that is a product of both 2 and 3.

Read the Lesson

Look at Example 1 on page 216. Complete each sentence.

3. The multiples 8, 16, and 24 are found on the lists of multiples for both 8 and 4. They are multiples that are common to both 8 and 4. Multiples that are common to both 8 and 4 are _________________ of 8 and 4.

4. The smallest multiple that is on the list for both 8 and 4 is 8. It has the least value of all the multiples that 8 and 4 have in common. This smallest common multiple is the _________________ or _____________ of 8 and 4.

Look at Example 2 on page 217. Complete each sentence.

5. A prime factor is a factor that is a ________________.

6. The example says to use each common prime factor once and then any remaining prime factors. The common prime factor in the example is 5 because _____________________________.

Remember What You Learned

7. Work with a partner to find the least common multiple of 8 and 12. Have one person find the LCM by making a list and have the other by using prime factors. Then exchange papers and check each other’s work.
**4-5 Study Guide and Intervention**

**Least Common Multiple**

A **multiple** of a number is the product of the number and any counting number. The multiples of 2 are below.

- $1 \times 2 = 2$
- $2 \times 2 = 4$
- $3 \times 2 = 6$
- $4 \times 2 = 8$
- $5 \times 2 = 10$

The smallest number that is a multiple of two or more whole numbers is the **least common multiple (LCM)** of the numbers.

**Example 1**

**Identify the first three common multiples of 3 and 6.**

**Step 1** List the multiples of each number.

- multiples of 3: 3, 6, 9, 12, 15, 18, ...
- multiples of 6: 6, 12, 18, 24, 30, ...

**Step 2** Identify the first three common multiples from the list.

The first three common multiples of 3 and 6 are 6, 12, and 18.

**Example 2**

**Find the LCM of 6 and 15 by using prime factors.**

**Step 1** Write the prime factorization of each number.

- $6 = 2 \times 3$
- $15 = 3 \times 5$

**Step 2** Identify all common prime factors.

- $6 = 2 \times 3$
- $15 = 3 \times 5$

**Step 3** Find the product of all of the prime factors using each common prime factor once and any remaining factors.

The LCM is $2 \times 3 \times 5$ or 30.

**Exercises**

**Identify the first three common multiples of each set of numbers.**

1. 2 and 4
2. 5 and 10
3. 2 and 7

**Find the LCM of each set of numbers.**

4. 5 and 6
5. 6 and 9
6. 4 and 10

7. 9 and 27
8. 4 and 6
9. 5 and 7
4-5

Skills Practice

Least Common Multiple

Identify the first three common multiples of each set of numbers.

1. 2 and 6
2. 3 and 6
3. 4 and 10

4. 4 and 6
5. 3 and 5
6. 5 and 25

Find the LCM of each set of numbers.

7. 7 and 10
8. 7 and 49
9. 6 and 9

10. 6 and 30
11. 5 and 6
12. 12 and 18

13. 8 and 28
14. 6 and 14
15. 5 and 14

16. 12 and 15
17. 9 and 24
18. 15 and 18

19. 12 and 14
20. 3, 5, and 12
21. 6, 16, and 24

22. 12, 18, and 24
23. 7, 10, and 14
24. 2, 5, and 12
Identify the first three common multiples of each set of numbers.

1. 4 and 5
2. 1 and 9
3. 3 and 4
4. 4, 6, and 8

Find the LCM of each set of numbers.

5. 3 and 5
6. 8 and 12
7. 3, 5, and 6
8. 6, 12, and 15

9. **PATTERNS** List the next four common multiples after the LCM of 3 and 8.

10. **E-MAIL** Alberto gets newsletters by e-mail. He gets one for sports every 5 days, one for model railroads every 10 days, and one for music every 8 days. If he got all three today, how many more days will it be until he gets all three newsletters on the same day?
1. **FORESTRY** Omar is planting trees. He has enough trees to plant 6, 7, or 14 trees in each row. What is the least number of trees Omar could have?

2. **BUSES** The Line A bus arrives at the bus stop every 25 minutes, and the Line B bus arrives every 15 minutes. They are both at the bus stop right now. In how many minutes will they both be at the bus stop again?

3. **MARCHING BAND** The high school marching band rehearses with either 6 or 10 members in every line. What is the least number of people that can be in the marching band?

4. **TIME** In a clock, a large gear completes a rotation every 45 seconds, and a small gear completes a rotation every 18 seconds. How many seconds pass before the gears align again?

5. **ROSES** Dante is planting his rose garden. He knows he can plant all of his roses by planting 12 or 15 rose bushes in every row. What is the least number of rose bushes Dante could have?

6. **FAMILY** Every 7 years the Lancaster family has a family reunion. Every 6 years they update their family tree. If they both had a photo taken and updated their family tree in 1997, in what year will both events occur again?
Perfect!

A **proper factor** of a number is any factor of the number except the number itself. You can use proper factors to classify numbers.

A number is **abundant** if the sum of its proper factors is greater than the number itself.

Proper factors of 12: 1, 2, 3, 4, 6

\[ 1 + 2 + 3 + 4 + 6 = 16 \]

16 > 12. So, 12 is **abundant**.

Now you can probably guess the definition of a perfect number. A number is **perfect** if the sum of its proper factors is equal to the number itself.

Proper factors of 6: 1, 2, 3

\[ 1 + 2 + 3 = 6 \]

So, 6 is **perfect**!

A number is **deficient** if the sum of its proper factors is less than the number itself.

Proper factors of 16: 1, 2, 4, 8

\[ 1 + 2 + 4 + 8 = 15 \]

15 < 16. So, 16 is **deficient**.

Tell whether each number is abundant, deficient, or perfect.

1. 8
2. 9
3. 15
4. 18
5. 20
6. 24
7. 25
8. 28
9. 30
10. 35

11. What is the least whole number that is abundant?

12. Is it possible for a prime number to be perfect? Explain.

13. Is it possible for the sum of two deficient numbers to be an abundant number? Explain.

14. **CHALLENGE** Show why 496 is a perfect number.
You can use a spreadsheet to help you find the least common multiple of two or more numbers. Use column A to enter the numbers for which you want to find the least common multiple.

Set the formulas for columns B through L as $A \times 2$, $A \times 3$, $A \times 4$, and so on.

After you have created the spreadsheet, calculate the values. Look for numbers in common in each row.

Here is an example of how to find the least common multiple of 3, 5, and 6.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>27</td>
<td>30</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>30</td>
<td>36</td>
<td>42</td>
<td>48</td>
<td>54</td>
<td>60</td>
<td>66</td>
<td>72</td>
</tr>
</tbody>
</table>

The least common multiple of 3, 5, and 6 is 30.

Use a spreadsheet to find the least common multiple of each set of numbers.

1. 10 and 15
2. 6 and 27
3. 6 and 11
4. 12 and 14
5. 4, 12, and 16
6. 6, 9, and 12

7. Is 50 a common multiple of 5, 10, and 6?

8. How many columns would you need in a spreadsheet to show the least common multiple of 16 and 17? Explain.

9. Use as many columns as needed to find the least common multiple of 6, 15, and 18.
Lesson 4–6

Lesson Reading Guide

Comparing and Ordering Fractions

Get Ready for the Lesson

Complete the Mini Lab at the top of page 220 in your textbook.
Write your answers below.

1. Which fraction is greater?

Use a model to determine which fraction is greater.

2. \(\frac{1}{2}\) or \(\frac{3}{7}\)

3. \(\frac{1}{6}\) or \(\frac{2}{9}\)

4. \(\frac{3}{8}\) or \(\frac{4}{7}\)

Read the Lesson

For Exercises 4–6, look at the key concept box on page 220.

4. How is LCM related to LCD?

5. How can you find the least common denominator?

6. For the second step, it says to write an equivalent fraction for each fraction using the LCD. What are equivalent fractions?

7. When comparing numbers, you can use the signs \(<\), \(>\), and \(=\). What does each sign mean?

Remember What You Learned

8. Explain how to order fractions having different denominators from least to greatest.
4-6 Study Guide and Intervention

Comparing and Ordering Fractions

To compare two fractions,
• Find the least common denominator (LCD) of the fractions; that is, find the least common multiple of the denominators.
• Write an equivalent fraction for each fraction using the LCD.
• Compare the numerators.

Example 1 Replace • with <, >, or = to make \( \frac{1}{3} \bullet \frac{5}{12} \) true.

• The LCM of 3 and 12 is 12. So, the LCD is 12.
• Rewrite each fraction with a denominator of 12.

\[
\begin{align*}
\frac{1}{3} &= \frac{\times 4}{12} = \frac{4}{12}, \\
\frac{5}{12} &= \frac{5}{12}
\end{align*}
\]

• Now, compare. Since \( 4 < 5 \), \( \frac{4}{12} < \frac{5}{12} \). So \( \frac{1}{3} < \frac{5}{12} \).

Example 2 Order \( \frac{1}{6}, \frac{2}{3}, \frac{1}{4}, \) and \( \frac{3}{8} \) from least to greatest.

The LCD of the fractions is 24. So, rewrite each fraction with a denominator of 24.

\[
\begin{align*}
\frac{1}{6} &= \frac{\times 4}{24} = \frac{4}{24}, \\
\frac{2}{3} &= \frac{\times 8}{24} = \frac{16}{24}, \\
\frac{1}{4} &= \frac{\times 6}{24} = \frac{6}{24}, \\
\frac{3}{8} &= \frac{\times 3}{24} = \frac{9}{24}.
\end{align*}
\]

The order of the fractions from least to greatest is \( \frac{1}{6}, \frac{1}{4}, \frac{3}{8}, \frac{2}{3} \).

Exercises

Replace each • with <, >, or = to make a true sentence.

1. \( \frac{5}{12} \bullet \frac{3}{8} \)
2. \( \frac{6}{8} \bullet \frac{3}{4} \)
3. \( \frac{2}{7} \bullet \frac{1}{6} \)

Order the fractions from least to greatest.

4. \( \frac{3}{4}, \frac{3}{8}, \frac{1}{2}, \frac{1}{4} \)
5. \( \frac{2}{3}, \frac{1}{6}, \frac{5}{18}, \frac{7}{9} \)
6. \( \frac{1}{2}, \frac{5}{6}, \frac{5}{8}, \frac{5}{12} \)
Skills Practice

Comparing and Ordering Fractions

Replace each \( \cdot \) with \(<\), \(>\), or \(=\) to make a true sentence.

1. \(\frac{2}{3} \cdot \frac{3}{4}\)
2. \(\frac{3}{8} \cdot \frac{6}{16}\)
3. \(\frac{5}{8} \cdot \frac{7}{12}\)

4. \(\frac{1}{2} \cdot \frac{6}{7}\)
5. \(\frac{3}{9} \cdot \frac{1}{3}\)
6. \(\frac{1}{6} \cdot \frac{9}{10}\)

7. \(\frac{5}{6} \cdot \frac{7}{8}\)
8. \(\frac{5}{8} \cdot \frac{5}{12}\)
9. \(\frac{4}{5} \cdot \frac{2}{3}\)

10. \(\frac{6}{7} \cdot \frac{4}{5}\)
11. \(\frac{5}{12} \cdot \frac{3}{16}\)
12. \(\frac{3}{4} \cdot \frac{2}{9}\)

13. \(\frac{5}{7} \cdot \frac{7}{10}\)
14. \(\frac{2}{15} \cdot \frac{1}{6}\)
15. \(\frac{5}{12} \cdot \frac{2}{5}\)

16. \(\frac{3}{10} \cdot \frac{5}{14}\)
17. \(\frac{4}{9} \cdot \frac{3}{7}\)
18. \(\frac{3}{5} \cdot \frac{5}{9}\)

19. \(\frac{1}{6} \cdot \frac{2}{12}\)
20. \(\frac{7}{9} \cdot \frac{4}{7}\)
21. \(\frac{9}{10} \cdot \frac{11}{12}\)

22. \(\frac{1}{4} \cdot \frac{2}{8}\)
23. \(\frac{8}{9} \cdot \frac{7}{8}\)
24. \(\frac{2}{9} \cdot \frac{4}{15}\)

Order the fractions from least to greatest.

25. \(\frac{3}{4}, \frac{2}{5}, \frac{5}{8}, \frac{1}{2}\)
26. \(\frac{1}{3}, \frac{2}{7}, \frac{3}{14}, \frac{1}{6}\)
27. \(\frac{2}{3}, \frac{4}{9}, \frac{5}{6}, \frac{7}{12}\)

28. \(\frac{4}{5}, \frac{2}{3}, \frac{13}{15}, \frac{7}{9}\)
29. \(\frac{11}{12}, \frac{5}{6}, \frac{3}{4}, \frac{9}{16}\)
30. \(\frac{7}{15}, \frac{3}{5}, \frac{5}{12}, \frac{1}{2}\)
Replace each ● with <, >, or = to make a true statement.

1. \(\frac{11}{21} \, \overset{\text{●}}{\text{●}} \, \frac{2}{3}\)
2. \(\frac{1}{2} \, \overset{\text{●}}{\text{●}} \, \frac{9}{18}\)
3. \(\frac{3}{8} \, \overset{\text{●}}{\text{●}} \, \frac{8}{24}\)

4. \(\frac{6\frac{2}{3}}{6\frac{12}{15}}\)
5. \(\frac{5\frac{3}{4}}{5\frac{8}{12}}\)
6. \(\frac{2}{3} \, \overset{\text{●}}{\text{●}} \, \frac{10}{18}\)

7. \(\frac{18}{14} \, \overset{\text{●}}{\text{●}} \, \frac{1\frac{2}{7}}{1\frac{2}{7}}\)
8. \(\frac{11}{12} \, \overset{\text{●}}{\text{●}} \, \frac{2\frac{1}{3}}{2\frac{1}{3}}\)
9. \(\frac{3\frac{4}{18}}{1\frac{5}{6}}\)

Order the fractions from least to greatest.

10. \(\frac{3\frac{1}{5}}{\frac{1}{4}}, \frac{1\frac{1}{2}}{2\frac{1}{5}}\)
11. \(\frac{7\frac{13}{9}}{\frac{5}{18}}, \frac{2}{3}\)

12. \(\frac{6\frac{3}{4}}{6\frac{1}{2}}, \frac{6\frac{5}{6}}{6\frac{3}{8}}\)
13. \(\frac{2\frac{2}{3}}{2\frac{6}{15}}, \frac{2\frac{3}{5}}{2\frac{4}{9}}\)

14. **MUSIC** Ramundus is making a xylophone. So far, he has bars that are \(1\frac{3}{4}\) feet, \(1\frac{7}{12}\) feet, and \(1\frac{2}{3}\) feet long. What is the length of the longest bar?

15. **DANCE** Alana practiced dancing for \(\frac{11}{4}\) hours on Monday, \(\frac{19}{8}\) hours on Wednesday, and \(2\frac{3}{5}\) hours on Friday. On which day did she practice the closest to 2 hours? Explain your reasoning.
### Word Problem Practice

#### Comparing and Ordering Fractions

1. **SHOES** Toya is looking in her closet. If \( \frac{1}{3} \) of her shoes are black and \( \frac{2}{5} \) are brown, does she have more black shoes or more brown shoes? Explain.

2. **BUDGET** Daniel spends \( \frac{3}{7} \) of his money on rent and \( \frac{4}{9} \) of his money on food. Does he spend more money on food or rent? Explain.

3. **WOODWORKING** Isi drilled a hole that is \( \frac{5}{9} \) inch wide. She has a screw that is \( \frac{5}{6} \) inch wide. Is the hole wide enough to fit the screw? Explain.

4. **FOOD** In a recent survey, \( \frac{2}{5} \) of the people surveyed said their favorite food was pizza, \( \frac{1}{4} \) said it was hot dogs, and \( \frac{3}{10} \) said it was popcorn. Which food was favored by the greatest number of people? Explain.

5. **OFFICE SUPPLIES** A blue paper clip is \( \frac{1}{6} \) inch wide. A silver paper clip is \( \frac{3}{8} \) inch wide, and a red paper clip is \( \frac{1}{3} \) inch wide. What color paper clip has the smallest width? Explain.

6. **GUMBALLS** A red gumball is \( \frac{5}{8} \) inch across. A green gumball is \( \frac{5}{6} \) inch across, and a blue gumball is \( \frac{7}{9} \) inch across. List the gumballs in order from smallest to largest.
Developing Fraction Sense

If someone asked you to name a fraction between $\frac{4}{7}$ and $\frac{6}{7}$, you probably would give the answer $\frac{5}{7}$ pretty quickly. But what if you were asked to name a fraction between $\frac{4}{7}$ and $\frac{5}{7}$? At the right, you can see how to approach the problem using “fraction sense.” So, one fraction between $\frac{4}{7}$ and $\frac{5}{7}$ is $\frac{9}{14}$.

Use your fraction sense to solve each problem.

1. Name a fraction between $\frac{1}{3}$ and $\frac{2}{3}$.

2. Name a fraction between $\frac{3}{5}$ and $\frac{4}{5}$.

3. Name five fractions between $\frac{1}{2}$ and 1.

4. Name five fractions between 0 and $\frac{1}{4}$.

5. Name a fraction between $\frac{1}{4}$ and $\frac{1}{2}$ whose denominator is 16.

6. Name a fraction between $\frac{2}{3}$ and $\frac{3}{4}$ whose denominator is 10.

7. Name a fraction between 0 and $\frac{1}{6}$ whose numerator is 1.

8. Name a fraction between 0 and $\frac{1}{10}$ whose numerator is not 1.

9. Name a fraction that is halfway between $\frac{2}{9}$ and $\frac{5}{9}$.

10. Name a fraction between $\frac{1}{4}$ and $\frac{3}{4}$ that is closer to $\frac{1}{4}$ than $\frac{3}{4}$.

11. Name a fraction between 0 and $\frac{1}{2}$ that is less than $\frac{3}{10}$.

12. Name a fraction between $\frac{1}{2}$ and 1 that is less than $\frac{3}{5}$.

13. Name a fraction between $\frac{1}{2}$ and $\frac{3}{4}$ that is greater than $\frac{4}{5}$.

14. How many fractions are there between $\frac{1}{4}$ and $\frac{1}{2}$?
Get Ready for the Lesson
Read the introduction at the top of page 225 in your textbook. Write your answers below.

1. Write the word form of the decimal that represents the part of those surveyed who play a stringed instrument.

2. Write this decimal as a fraction.

3. Repeat Exercises 1 and 2 with each of the other decimals.

Read the Lesson
For Exercises 4–6, look at Example 1 on page 225.
4. Why is the denominator of the fraction 10?

5. How does the example tell you to simplify the fraction?

6. What do the letters GCF stand for?

7. Look at Example 3 on page 226. What is the place value of the last decimal place? What does that mean when you go to write the corresponding fraction?

Remember What You Learned
8. Work with a partner. Each of you write several decimals with varying numbers of digits. Next, exchange papers and write the decimals as fractions. Then, exchange the papers again and check one another’s work.
Decimals like 0.58, 0.12, and 0.08 can be written as fractions. To write a decimal as a fraction, you can follow these steps.

1. Identify the place value of the last decimal place.
2. Write the decimal as a fraction using the place value as the denominator.

**Example 1**

Write 0.5 as a fraction in simplest form.

\[
0.5 = \frac{5}{10} \quad \text{0.5 means five tenths.}
\]

\[
= \frac{1}{2}
\]

Simplify. Divide the numerator and denominator by the GCF, 5.

So, in simplest form, 0.5 is \(\frac{1}{2}\).

**Example 2**

Write 0.35 as a fraction in simplest form.

\[
0.35 = \frac{35}{100} \quad \text{0.35 means 35 hundredths.}
\]

\[
= \frac{7}{20}
\]

Simplify. Divide the numerator and denominator by the GCF, 5.

So, in simplest form, 0.35 is \(\frac{7}{20}\).

**Example 3**

Write 4.375 as a mixed number in simplest form.

\[
4.375 = 4 \frac{375}{1000} \quad \text{0.375 means 375 thousandths.}
\]

\[
= 4 \frac{375}{1250}
\]

Simplify. Divide by the GCF, 125.

\[
= 4 \frac{3}{8}
\]

**Exercises**

Write each decimal as a fraction or mixed number in simplest form.

1. 0.9
2. 0.8
3. 0.27
4. 0.75

5. 0.34
6. 0.125
7. 0.035
8. 0.008

9. 1.4
10. 3.6
11. 6.28
12. 2.65

13. 12.05
14. 4.004
15. 23.205
16. 51.724
**Skills Practice**

**Writing Decimals as Fractions**

Write each decimal as a fraction or mixed number in simplest form.

1. 0.6
2. 10.9
3. 0.08

4. 6.25
5. 4.125
6. 0.075

7. 9.35
8. 3.56
9. 8.016

10. 21.5
11. 0.055
12. 7.42

13. 5.006
14. 3.875
15. 1.29

16. 2.015
17. 6.48
18. 0.004

19. 4.95
20. 8.425
21. 9.74

22. 0.47
23. 5.019
24. 1.062

25. 3.96
26. 0.824
27. 20.8

28. 6.45
29. 4.672
30. 0.375
Practice
Writing Decimals as Fractions

Write each decimal as a fraction in simplest form.

1. 0.5  
2. 0.8  
3. 0.9  
4. 0.75  
5. 0.48  
6. 0.72  
7. 0.625  
8. 0.065  
9. 0.002  

Write each decimal as a mixed number in simplest form.

10. 3.6  
11. 10.4  
12. 2.11  
13. 29.15  
14. 7.202  
15. 23.535  

16. DISTANCE The library is 0.96 mile away from Theo’s home. Write this distance as a fraction in simplest form.

17. INSECTS A Japanese beetle has a length between 0.3 and 0.5 inch. Find two lengths that are within the given span. Write them as fractions in simplest form.
### Word Problem Practice

**Writing Decimals as Fractions**

1. **FIELD TRIP** About 0.4 of a biology class will be going on a field trip. Write the decimal as a fraction in simplest form.

2. **EARTH** Eighty percent of all life on Earth is below the ocean’s surface. Write 0.80 as a fraction in simplest form.

3. **VENUS** The planet Venus is 67.24 million miles away from the Sun. Write the decimal as a mixed number in simplest form.

4. **SATURN** If you weighed 138 pounds on Earth, you would weigh 128.34 pounds on Saturn. Write the weight on Saturn as a mixed number in simplest form.

5. **MERCURY** If you were 10 years old on Earth, you would be 41.494 years old on Mercury. Write the age on Mercury as a mixed number in simplest form.

6. **INTERNET** According to recent figures, 4.65 million people in the Middle East are online. Write the decimal as a mixed number in simplest form.
4-7

Enrichment

Estimating with Decimals and Fractions

Often you only need to give a fractional estimate for a decimal. To make fractional estimates, it helps to become familiar with the fraction-decimal equivalents shown in the chart at the right. You also should be able to identify the fraction as an overestimate or underestimate. Here’s how.

The decimal 0.789 is a little less than 0.8, so it is a little less than \( \frac{4}{5} \). Write \( \frac{4}{5} \).

The decimal 1.13 is a little more than 1.125, so it is a little more than \( 1 \frac{1}{8} \). Write \( 1 \frac{1}{8} \).

Write a fractional estimate for each decimal. Be sure to identify your estimate as an overestimate or an underestimate.

1. 0.243
2. 0.509
3. 0.429

4. 0.741
5. 0.88
6. 0.63

7. 0.09
8. 0.57
9. 1.471

10. 2.76
11. 1.289
12. 5.218

13. The scale in the delicatessen shows 0.73 pound. Write a fractional estimate for this weight.

14. Darnell ordered a quarter pound of cheese. The scale shows 0.23 pound. Is this more or less than he ordered?

15. On the stock market, prices are listed as halves, fourths, and eighths of a dollar. Yesterday the price of one share of a stock was $25.61. Write a fractional estimate for this amount.

16. Charlotte used a calculator to figure out how many yards of ribbon she needed for a craft project. The display shows 2.53125. Write a fractional estimate for this length.
A scientific calculator can be used to convert decimals to fractions. On the TI-34 II, the \( \text{Frac} \) button converts decimals to fractions. After converting a fraction to a decimal, use the \( \text{Simp} \) button to reduce the fraction into simplest form. Push \( \text{Simp} \) until \( \text{N/D} \rightarrow \text{n/d} \) no longer appears.

**Example 1**
Convert 0.22 to a fraction.

Enter: .22 \( \text{Frac} \) \( \text{Simp} \) \( \text{Simp} \)

So, 0.22 = \( \frac{11}{50} \).

**Example 2**
Convert 0.12 to a fraction.

Enter: .12 \( \text{Frac} \) \( \text{Simp} \) \( \text{Simp} \) \( \text{Simp} \)

So, 0.12 = \( \frac{3}{25} \).

**Example 3**
Convert 0.6 to a fraction.

Enter: .6 \( \text{Frac} \) \( \text{Simp} \) \( \text{Simp} \) \( \text{Simp} \)

So, 0.6 = \( \frac{3}{5} \).

Use a calculator to convert each decimal to a fraction. Write in simplest form.

1. 0.25
2. 0.5
3. 0.10
4. 0.3
5. 0.125
6. 0.625
7. 0.21
8. 0.65
9. 0.9
10. 0.32
11. 0.80
12. 0.875
13. 0.75
14. 0.215
15. 0.62
16. 0.31
17. 0.72
18. 0.66
19. 0.23
20. 0.42
21. 0.88
4-8 Lesson Reading Guide

Writing Fractions as Decimals

Get Ready for the Lesson

Read the introduction at the top of page 229 in your textbook.
Write your answers below.

1. Write the decimal for $\frac{3}{10}$.

2. Write the fraction equivalent to $\frac{1}{2}$ with a denominator of 10.

3. Write the decimal for the fraction you found in Exercise 2.

Read the Lesson

4. Look at Exercise 2 at the top of page 229. What do you need to do to the fraction in order to write the decimal?

5. Look at Example 1 on page 229. Why do you multiply both the numerator and denominator by 2?

6. Look at Example 3 on page 230. Why do you annex zeros in method 1?

7. Explain what the word *annex* means.

Remember What You Learned

8. Write the following fractions as decimals. First, use the paper and pencil method. Then, use a calculator and compare your answers.

   \[ \frac{3}{12}, \frac{3}{20}, \frac{1}{5}, \frac{5}{8} \]
Fractions whose denominators are factors of 10, 100, or 1,000 can be written as decimals using equivalent fractions. Any fraction can also be written as a decimal by dividing the numerator by the denominator.

**Example 1**  
Write \(\frac{3}{5}\) as a decimal.

Since 5 is a factor of 10, write an equivalent fraction with a denominator of 10.

\[
\frac{3}{5} = \frac{6}{10} = 0.6
\]

Therefore, \(\frac{3}{5} = 0.6\).

**Example 2**  
Write \(\frac{3}{8}\) as a decimal.

Divide.

\[
\begin{array}{c|c}
8 & 3.000 \\
\hline
 & -24 \\
\hline
 & 60 \\
 & -56 \\
\hline
 & 40 \\
 & -40 \\
\hline
 & 0 \\
\end{array}
\]

Therefore, \(\frac{3}{8} = 0.375\).

**Exercises**

Write each fraction or mixed number as a decimal.

1. \(\frac{3}{10}\)  
2. \(\frac{3}{4}\)  
3. \(\frac{1}{4}\)  
4. \(\frac{3}{5}\)

5. \(\frac{1}{8}\)  
6. \(2\frac{1}{4}\)  
7. \(\frac{6}{20}\)  
8. \(\frac{9}{25}\)

9. \(1\frac{3}{8}\)  
10. \(1\frac{5}{8}\)  
11. \(3\frac{5}{16}\)  
12. \(4\frac{9}{20}\)
### 4-8 Skills Practice

**Writing Fractions as Decimals**

Write each fraction or mixed number as a decimal.

1. \(\frac{9}{10}\)
2. \(\frac{21}{100}\)
3. \(\frac{3}{4}\)

4. \(\frac{1}{2}\)
5. \(\frac{2}{5}\)
6. \(\frac{7}{10}\)

7. \(\frac{5}{8}\)
8. \(3\frac{7}{8}\)
9. \(9\frac{2}{5}\)

10. \(\frac{66}{200}\)
11. \(\frac{3}{20}\)
12. \(6\frac{5}{8}\)

13. \(5\frac{2}{5}\)
14. \(12\frac{3}{8}\)
15. \(10\frac{17}{20}\)

16. \(2\frac{7}{16}\)
17. \(3\frac{11}{16}\)
18. \(6\frac{4}{5}\)

19. \(1\frac{11}{25}\)
20. \(10\frac{1}{8}\)
21. \(2\frac{1}{16}\)

22. \(3\frac{19}{20}\)
23. \(5\frac{12}{75}\)
24. \(3\frac{24}{25}\)
4-8  

### Writing Fractions as Decimals

Write each fraction or mixed number as a decimal.

1. \( \frac{4}{5} \)  
2. \( \frac{7}{20} \)  
3. \( \frac{13}{250} \)

4. \( \frac{7}{8} \)  
5. \( \frac{3}{16} \)  
6. \( \frac{11}{32} \)

7. \( \frac{29}{40} \)  
8. \( \frac{29}{80} \)  
9. \( \frac{11\frac{1}{32}}{} \)

Replace each \( \bullet \) with <, >, or = to make a true sentence.

10. \( \frac{1}{4} \bullet 0.2 \)  
11. \( \frac{13}{20} \bullet 0.63 \)  
12. \( 0.5 \bullet \frac{3}{5} \)

13. **DISTANCE** River Road is 11\( \frac{4}{5} \) miles long. Prairie Road is 14.9 miles long. How much longer is Prairie Road than River Road?

14. **ANIMALS** The table shows lengths of different pond insects. Using decimals, name the insect having the smallest length and the insect having the greatest length.

<table>
<thead>
<tr>
<th>Pond Insects</th>
<th>Deer Fly</th>
<th>Spongilla Fly</th>
<th>Springtail</th>
<th>Water Treader</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length (in.)</strong></td>
<td>( \frac{2}{5} )</td>
<td>( \frac{3}{10} )</td>
<td>( \frac{3}{20} )</td>
<td>( \frac{1}{2} )</td>
</tr>
</tbody>
</table>

*Source: Golden Nature Guide to Pond Life*
1. **PLANETS** The planet Mercury is roughly \( \frac{2}{5} \) the size of Earth. Write the fraction as a decimal.

2. **MARBLES** Lin has a marble that is \( \frac{5}{8} \) inch wide. Write the marble’s width as a decimal.

3. **HOMEWORK** Miko has finished \( \frac{5}{16} \) of her homework. Write the fraction as a decimal.

4. **EXERCISE** Tate has been dancing for \( \frac{7}{10} \) of an hour. Write this fraction as a decimal.

5. **SPORTS** Charlie played tennis for \( 3\frac{3}{4} \) hours. Write the mixed number as a decimal.

6. **COOKING** A recipe calls for \( 2\frac{3}{4} \) cups of milk. Write the mixed number as a decimal.

7. **HEIGHT** Winona is \( 2\frac{3}{12} \) the height of her little brother. Write the mixed number as a decimal.

8. **RECESS** Jennifer has been spinning in circles for \( 4\frac{3}{16} \) minutes. Write the mixed number as a decimal.
Tagging Along

Which of \( \frac{2}{3} \), \( \frac{3}{4} \), \( \frac{4}{5} \), and \( \frac{9}{10} \) belongs in the “tag” on the number line at the right? The tag is to the right of 0.75, so the fraction must be greater than 0.75. Express each fraction as a decimal.

\[
\frac{2}{3} = 0.6, \quad \frac{3}{4} = 0.75, \quad \frac{4}{5} = 0.8, \quad \frac{9}{10} = 0.9
\]

Only 0.8 and 0.9 are greater than 0.75, and 0.9 is much closer to 1 than to 0.75. Choose 0.8, which is equal to \( \frac{4}{5} \).

On each number line, fill in the tags using the given fractions.

1. \( \frac{3}{8}, \frac{1}{2}, \frac{1}{3}, \frac{7}{9}, \frac{8}{10} \)

2. \( \frac{4}{3}, \frac{3}{4}, \frac{6}{5}, \frac{15}{8}, \frac{11}{16} \)

3. \( \frac{7}{4}, \frac{6}{5}, \frac{15}{8}, \frac{3}{2}, \frac{4}{3} \)

4. \( \frac{9}{5}, \frac{7}{3}, \frac{8}{5}, \frac{13}{6}, \frac{8}{4} \)

5. Write a fraction in simplest form for each tag on this number line. Use only the denominators 2, 3, 4, 5, 8, and 10. Express numbers greater than 1 as improper fractions.
4-8

**TI-73 Activity**

**Fractions and Decimals**

Use the Fraction to Decimal key, 
, to explore patterns in fractions and decimals.
Set the number of decimal places to Float. Set the calculator to ManSimp.

Example 1
To change from a fraction to a decimal, either use or divide the numerator by the denominator. Write \( \frac{1}{7} \) as a decimal.

| Keys: \( 1 \ \begin{array}{c} b_c \\ \end{array} 7 \ F\rightarrow D \ ENTER \) | Display: \( \frac{1}{7} \rightarrow D \ 0.1428571429 \) or \( 1 \ \begin{array}{c} \div \\ \end{array} 7 \ ENTER \) | \( \frac{1}{7} \ 0.1428571429 \)

Example 2
Use Lists to explore patterns in fractions and decimals.

**Step 1**
Clear all lists. \( 2nd \) [MEM] 6 ENTER

**Step 2**
In L1, enter \( \frac{1}{9} \), \( \frac{2}{9} \), \( \frac{3}{9} \), and \( \frac{4}{9} \), using the \( b_c \) key.

**Step 3**
Highlight L2. Enter a formula to convert fractions to decimals.

**Step 4**
Describe the pattern and predict. Each decimal is the numerator of the fraction repeated. The predicted value of \( \frac{5}{9} \) is 0.555555.

Test this prediction by entering \( \frac{5}{9} \) into L1.

Express each fraction as a decimal. Use \( b_c \). Then use division.
Check that the results match. Describe the pattern you see. Use the pattern to predict. Check your prediction.

1. \( \frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \frac{5}{8}, \frac{6}{8} \). Predict \( \frac{7}{8} \).

2. \( \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6} \). Predict \( \frac{5}{6} \).

Use the list you created in Example 2. Enter the new fractions in L1. Describe the pattern. Predict. Test your conjecture.

3. \( \frac{1}{99}, \frac{2}{99}, \frac{3}{99}, \frac{4}{99} \). Predict \( \frac{5}{99} \).

4. \( \frac{1}{999}, \frac{2}{999}, \frac{3}{999}, \frac{4}{999} \). Predict \( \frac{5}{999} \).
Lesson 4–9

Get Ready for the Lesson

Read the introduction at the top of page 233 in your textbook. Write your answers below.

1. How is the map labeled?

2. Location C5 is closest to the end of which street?

3. Identify where Cedar Court and Juniper Lane intersect on the map.

Read the Lesson

4. What is an ordered pair? Write three examples.

5. What definition does a dictionary give for the word origin?

6. How does this definition of origin relate to the meaning of the word in terms of a coordinate plane?

Remember What You Learned

7. Work with a partner. Have one of you plot a point on a coordinate plane, without showing your partner the point. Have your partner guess the location of the point. Without giving them the exact location, give them a hint of which direction they need to move to guess your point. Continue with a guess and a hint until your partner names the correct point. Then exchange roles and see who can name the point in the fewest number of guesses.
A coordinate plane is formed when two number lines intersect at their zero points. This intersection is called the origin. The horizontal number line is called the x-axis. The vertical number line is called the y-axis.

An ordered pair is used to name a point on a coordinate plane. The first number in the ordered pair is the x-coordinate, and the second number is the y-coordinate.

**Example 1**  Write the ordered pair that names point A.

Start at the origin. Move right along the x-axis until you are under point A. The x-coordinate is 4.

Then move up until you reach point A. The y-coordinate is 1.

So, point A is named by the ordered pair (4, 1).

**Example 2**  Graph the point W(2, 4).

Start at the origin. Move 2 units to the right along the x-axis.

Then move 4 units up to locate the point. Draw a dot and label the point W.

**Exercises**

Use the coordinate plane at the right to name the ordered pair for each point.

1. J
2. K
3. L
4. M

Graph and label each point on the coordinate plane.

5. S(1, 3)
6. T(4, 0)
Skills Practice

Algebra: Ordered Pairs and Functions

Use the coordinate plane at the right to name the ordered pair for each point.

1. L
2. M
3. N
4. P
5. Q
6. R
7. S
8. T

Graph and label each point on the coordinate plane.

9. A(1, 3)  
10. B(4, 3)  
11. C(2, 0)

12. D(2, 5)  
13. E(2.5, 1.5)  
14. F(1\frac{1}{2}, 2)
4-9

Practice

Algebra: Ordered Pairs and Functions

Use the coordinate plane at the right to name the ordered pair for each point.

1. A
2. B
3. C
4. D
5. F
6. G
7. H
8. J
9. K
10. M

Graph and label each point on the coordinate plane at the right.

11. N (4, 3)
12. P (0, 4)
13. R (2, 4.5)
14. S (1.75, 2)
15. T (2.75, 4)
16. W (3, 1.5)
17. A (4.25, 1)
18. B (1, 3.75)

CAR WASH For Exercises 19 and 20, use the following information.

A car wash can wash four cars in one hour. The table shows the total number of cars washed in 0, 1, 2, and 3 hours.

<table>
<thead>
<tr>
<th>Hours</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars Washed</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

19. List this information as ordered pairs (number of hours, number of cars washed).

20. Graph the ordered pairs on the coordinate plane at the right. Then describe the graph.

21. GEOMETRY A square drawn on a coordinate plane has the following ordered pairs: (2, 2.5), (2, 6.5), and (6, 2.5). What is the ordered pair of the fourth point?
EXERCISE The table shows the time it takes Quentin to jog 1, 2, 3, and 4 laps around the track.

<table>
<thead>
<tr>
<th>Number of Times Around Track</th>
<th>Total Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>

3. List this information as ordered pairs (number of times around track, total time).

4. Graph the ordered pairs. Then describe the graph.

PHOTOGRAPHY A photography store sells black and white film. The cost of 1, 2, and 3 rolls of black and white film are shown in the table.

<table>
<thead>
<tr>
<th>Number of Rolls</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

1. List this information as ordered pairs (number of rolls of film, cost).

2. Graph the ordered pairs. Then describe the graph.

FOOTBALL In football, each field goal made scores 3 points. The table shows this relationship.

<table>
<thead>
<tr>
<th>Field Goals Made</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

5. List this information as ordered pairs (field goals made, total points).

6. Graph the ordered pairs. Then describe the graph.

JEWELRY The table gives the number of beads needed to make bracelets of lengths 7, 7.5, 8, and 8.5 inches.

<table>
<thead>
<tr>
<th>Bracelet Length (in.)</th>
<th>Number of Beads</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>7.5</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>8.5</td>
<td>34</td>
</tr>
</tbody>
</table>

7. List this information as ordered pairs (bracelet length, number of beads).

8. Graph the ordered pairs. Then describe the graph.
Investigating Coordinate Grids

You can use coordinate grids to display sets of ordered pairs. You can also find new ordered pairs by looking at the line that the plotted ordered pairs make.

The table below lists the cost of tickets to a play. The data from the table are plotted on the grid.

<table>
<thead>
<tr>
<th>Number of Tickets</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$10.00</td>
</tr>
<tr>
<td>4</td>
<td>$20.00</td>
</tr>
<tr>
<td>6</td>
<td>$30.00</td>
</tr>
<tr>
<td>8</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

The table shows the cost of 2, 4, 6, and 8 tickets. To find the cost of 5 tickets, you can use the grid to find the ordered pair that fits the table.

- Start at the origin and move to 5 on the x-axis. This is the x-coordinate.
- Move up until you meet the line. Then follow across to the left to the y-axis to find the corresponding y-coordinate. The value is 25.
- The ordered pair is (5, 25). This ordered pair means 5 tickets cost $25.

EXERCISES  Use the data plotted on the coordinate grid to answer the questions.

<table>
<thead>
<tr>
<th>Time (in hours)</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>240</td>
</tr>
<tr>
<td>3</td>
<td>360</td>
</tr>
<tr>
<td>5</td>
<td>600</td>
</tr>
<tr>
<td>8</td>
<td>960</td>
</tr>
</tbody>
</table>

1. How many miles did the airplane travel in 1 hour?
2. How many miles did the airplane travel in 2 hours?
3. How many miles did the airplane travel in 5 hours?
4. How long did it take the airplane to travel 720 miles?
5. How long did it take the airplane to travel 360 miles?
**Part 1: Multiple Choice**

Read each question. Then fill in the correct answer.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part 2: Short Response/Grid in**

Record your answer in the blank.

For grid in questions, also enter your answer in the grid by writing each number or symbol in a box. Then fill in the corresponding circle for that number or symbol.

9. ____________  
10. ____________ (grid in)

**Part 3: Extended Response**

Record your answers for Question 11 on the back of this paper.
General Scoring Guidelines

- If a student gives only a correct numerical answer to a problem but does not show how he or she arrived at the answer, the student will be awarded only 1 credit. All extended-response questions require the student to show work.
- A fully correct answer for a multiple-part question requires correct responses for all parts of the question. For example, if a question has three parts, the correct response to one or two parts of the question that required work to be shown is not considered a fully correct response.
- Students who use trial and error to solve a problem must show their method. Merely showing that the answer checks or is correct is not considered a complete response for full credit.

Exercise 11 Rubric

<table>
<thead>
<tr>
<th>Score</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The square is copied and 0.25 of the square is accurately shaded. The rectangle is copied and $\frac{1}{3}$ of the rectangle is accurately shaded. The shaded area of the rectangle is recognized as being greater than the shaded area of the square, and a correct and complete explanation is given.</td>
</tr>
<tr>
<td>3</td>
<td>The drawings are correct, and the explanation is correct but not complete. OR The drawings are carelessly drawn, and the explanation is correct and complete.</td>
</tr>
<tr>
<td>2</td>
<td>The drawings are correct, and the shaded area of the rectangle is recognized as being greater than the shaded area of the square. However, the explanation is incorrect or not given. OR Only one of the drawings is correct. The shaded area of the rectangle is recognized as being greater than the shaded area of the square, and the explanation is correct.</td>
</tr>
<tr>
<td>1</td>
<td>Only one of the drawings is correct, and the explanation is incorrect. OR Both drawings are incorrect, but the explanation is correct. OR Both drawings are correct, but the shaded area of the rectangle is not recognized as being greater than the shaded area of the square.</td>
</tr>
<tr>
<td>0</td>
<td>Response is completely incorrect.</td>
</tr>
</tbody>
</table>
Chapter 4 Quiz 2
(Lessons 4-4 and 4-5)

1. **FOOD** Arielle is making a taco salad with lettuce, ground beef, tomatoes, and cheese. How many different ways can Arielle layer the ingredients of the taco salad?

Find the LCM of each set of numbers.

2. 5 and 7
3. 8 and 12
4. 2, 3, and 12

5. **FITNESS** Aunt Isabelle walks every day, bikes every two days, and swims every three days. How often does she do all three activities on the same day?
Chapter 4 Quiz 3
(Lessons 4-6 and 4-7)

For Questions 1–3, replace each • with <, >, or = to make a true sentence.

1. \( \frac{2}{3} \) • \( \frac{4}{5} \)
2. \( \frac{5}{6} \) • \( \frac{39}{48} \)
3. \( \frac{3}{4} \) • \( \frac{24}{32} \)

4. Order the fractions \( \frac{5}{6}, \frac{1}{2}, \frac{7}{9}, \) and \( \frac{2}{3} \) from least to greatest.

5. MULTIPLE-CHOICE TEST ITEM
Who do you want to help most when you volunteer?

<table>
<thead>
<tr>
<th>Area</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Countries</td>
<td>( \frac{1}{5} )</td>
</tr>
<tr>
<td>My Country</td>
<td>( \frac{1}{4} )</td>
</tr>
<tr>
<td>My City</td>
<td>( \frac{43}{100} )</td>
</tr>
<tr>
<td>My Neighborhood</td>
<td>( \frac{3}{25} )</td>
</tr>
</tbody>
</table>

6. According to the survey data, which is the least likely area in which young people will volunteer to help?
A. their country
B. other countries
C. their city
D. their neighborhood

7. Write each decimal as a fraction or mixed number in simplest form.

6. 0.45
7. 0.125
8. 6.04

9. HEALTH The average human body temperature is 98.6°F.
Write 98.6 as a mixed number in simplest form.

Chapter 4 Quiz 4
(Lessons 4-8 and 4-9)

Write each fraction or mixed number as a decimal.

1. \( \frac{7}{8} \)
2. \( \frac{7}{15} \)
3. \( 4 \frac{3}{25} \)

Use the coordinate plane at the right to name the ordered pair for each point.
4. A
5. B
For Questions 1–4, write the letter for the correct answer at the right of each question.

1. Which of the fractions is not in simplest form?
   A. \(\frac{4}{9}\)  
   B. \(\frac{8}{11}\)  
   C. \(\frac{10}{12}\)  
   D. \(\frac{11}{20}\)  
   1. __________

2. Replace the \(\bullet\) with a number so that \(\frac{5}{8} = \frac{\bullet}{72}\).
   F. 30  
   G. 35  
   H. 40  
   J. 45  
   2. __________

3. Which pair of numbers has a GCF of 3?
   A. 1, 3  
   B. 2, 6  
   C. 6, 15  
   D. 6, 24  
   3. __________

4. Write \(3\frac{2}{7}\) as an improper fraction.
   F. \(\frac{20}{7}\)  
   G. \(\frac{12}{7}\)  
   H. \(\frac{23}{7}\)  
   J. \(\frac{14}{7}\)  
   4. __________

5. ANIMALS A fennec fox weighs an average of \(3\frac{1}{4}\) pounds. What is this average weight as an improper fraction?
   A. \(\frac{13}{4}\)  
   B. \(\frac{7}{4}\)  
   C. \(\frac{2}{1}\)  
   D. \(\frac{14}{4}\)  
   5. __________

6. Write \(\frac{10}{48}\) in simplest form.  
   6. __________

7. READING Jane’s book has 32 pages. She has read 24 pages so far. Write a fraction in simplest form that compares the number of pages she has read to the total number of pages in the book.  
   7. __________

8. Write \(6\frac{3}{7}\) as an improper fraction.  
   8. __________

9. FOOD One serving of Tran’s favorite breakfast cereal is \(1\frac{1}{4}\) cups. Write \(1\frac{1}{4}\) as an improper fraction.  
   9. __________

10. Write \(\frac{23}{9}\) as a mixed number.  
    10. __________

11. Find the GCF of 6, 12, and 28.  
    11. __________

12. HEIGHT Sebastian is 64 inches tall. Find his height in terms of feet. Express your answer as a mixed number in simplest form.  
    12. __________
Choose from the terms above to complete each sentence.

1. A(n) ____________ uses overlapping circles to show elements that are common to the elements in the circles.

2. The ____________ is the least common multiple of the denominators.

3. The greatest of the factors that are common to two or more numbers is called the ____________.

4. Fractions that name the same number are ____________.

5. A(n) ____________ indicates the sum of a whole number and a fraction.

6. Shared multiples of two or more numbers are called ____________.

7. A(n) ____________ is a fraction in which the numerator is greater than or equal to the denominator.

8. A(n) ____________ is the product of a number and any whole number.

In your own words, define each term.

9. least common multiple (LCM)

10. simplest form
Write the letter for the correct answer in the blank at the right of each question.

1. What is the GCF of 6 and 8?
   A. 1        B. 2        C. 6        D. 12  1. ____

2. GARDENING Liam is planting 30 bean plants and 45 pea plants in his garden. If he puts the same number of plants in each row and if each row has only one type of plant, what is the greatest number of plants he can put in one row?
   F. 10       G. 15       H. 5        J. 3  2. ____

3. Replace the ● with a number so that \( \frac{1}{3} = \frac{\text{●}}{12} \).
   A. 2        B. 1        C. 4        D. 3  3. ____

4. What is the fraction \( \frac{8}{12} \) in simplest form?
   F. \( \frac{8}{12} \)       G. \( \frac{4}{6} \)       H. \( \frac{2}{3} \)       J. \( \frac{3}{4} \)  4. ____

5. PETS Four out of sixteen students in a classroom have cats as pets. Write \( \frac{4}{16} \) in simplest form.
   A. \( \frac{2}{8} \)       B. \( \frac{1}{8} \)       C. \( \frac{1}{4} \)       D. \( \frac{8}{32} \)  5. ____

6. Write \( 3 \frac{1}{2} \) as an improper fraction.
   F. \( \frac{7}{2} \)       G. \( \frac{6}{2} \)       H. \( \frac{6}{3} \)       J. \( \frac{7}{3} \)  6. ____

7. Write \( \frac{21}{5} \) as a mixed number.
   A. \( 4 \frac{1}{21} \)       B. \( \frac{1}{5} \)       C. \( 4 \frac{4}{5} \)       D. \( 4 \frac{1}{5} \)  7. ____

8. HOMEWORK Meagan has homework in science, social studies, and math. In how many different ways can Meagan do her homework?
   F. 3        G. 6        H. 9        J. 12  8. ____

9. What is the LCM of 3 and 12?
   A. 3        B. 6        C. 12        D. 36  9. ____

10. HOUSEWORK Every 2 days Jen takes out the trash. Every 3 days she sweeps the kitchen. How often does she have to do both chores on the same day?
    F. every 3 days       G. every 2 days       H. every 6 days       J. every 12 days  10. ____
11. Which fraction is less than $\frac{1}{2}$?

A. $\frac{3}{8}$  
B. $\frac{5}{8}$  
C. $\frac{5}{7}$  
D. $\frac{9}{16}$  

12. Which fraction is equal to $\frac{3}{4}$?

F. $\frac{4}{3}$  
G. $\frac{6}{8}$  
H. $\frac{4}{6}$  
J. $\frac{3}{8}$  

13. Order the fractions $\frac{3}{4}$, $\frac{1}{2}$, $\frac{3}{8}$, and $\frac{5}{8}$ from least to greatest.

A. $\frac{1}{2}$, $\frac{3}{8}$, $\frac{3}{8}$, $\frac{5}{8}$  
B. $\frac{1}{2}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{3}{8}$  

14. Write 0.9 as a fraction in simplest form.

F. $\frac{90}{100}$  
G. $\frac{9}{10}$  
H. $\frac{1}{9}$  
J. $\frac{9}{100}$  

15. Write 2.3 as a mixed number.

A. $2 \frac{3}{10}$  
B. $\frac{23}{10}$  
C. $2 \frac{3}{100}$  
D. $2 \frac{1}{3}$  

16. Write $\frac{1}{5}$ as a decimal.

F. 0.5  
G. 0.2  
H. 2.0  
J. 0.02  

17. Write $6 \frac{1}{4}$ as a decimal.

A. 6.5  
B. 6.2  
C. 6.25  
D. 6.025  

18. MEASURING The post office requires all letters be at least $3 \frac{1}{2}$ inches high.

Write $3 \frac{1}{2}$ as a decimal.

F. 3.25  
G. 0.35  
H. 3.5  
J. 3.2  

For Questions 19 and 20, use the coordinate plane below.

19. What ordered pair names point A?

A. (2, 6)  
B. (7, 2)  
C. (3, 7)  
D. (2, 7)  

20. What ordered pair names point B?

F. (2, 4)  
G. (4, 1)  
H. (4, 2)  
J. (5, 2)  

Bonus Write a fraction that is between 0.25 and 0.35.
Write the letter for the correct answer in the blank at the right of each question.

1. What is the GCF of 18 and 30?
   A. 2   B. 3   C. 6   D. 90
   1. __________

2. What is the GCF of 8, 12, and 30?
   F. 2   G. 3   H. 4   J. 120
   2. __________

3. RETAIL Pete is putting out 24 basketballs, 48 soccer balls, and 16 softballs in a store display. If he puts the same number of balls in each row and if each row has only one type of ball, what is the greatest number of balls Pete can put in one row?
   A. 24   B. 16   C. 8   D. 4
   3. __________

4. Replace the ● with a number so that \( \frac{5}{6} = \frac{\bullet}{48} \).
   F. 30   G. 40   H. 45   J. 60
   4. __________

5. Which of the fractions is not in simplest form?
   A. \( \frac{9}{20} \)   B. \( \frac{16}{25} \)   C. \( \frac{14}{32} \)
   D. \( \frac{7}{8} \)
   5. __________

6. MUSIC Lynn has a music collection of 60 records. Of those records, 18 are jazz. Write a fraction in simplest form that compares the number of jazz records to the total number of records.
   F. \( \frac{9}{30} \)   G. \( \frac{18}{60} \)   H. \( \frac{3}{10} \)   J. \( \frac{9}{10} \)
   6. __________

7. Write \( 8\frac{2}{5} \) as an improper fraction.
   A. \( \frac{42}{2} \)   B. \( \frac{16}{5} \)   C. \( \frac{42}{5} \)   D. \( \frac{80}{5} \)
   7. __________

8. Write \( \frac{46}{7} \) as a mixed number.
   F. \( 7\frac{3}{7} \)   G. \( 6\frac{4}{45} \)   H. \( 6\frac{3}{7} \)   J. \( 6\frac{4}{7} \)
   8. __________

9. SHOPPING A store sells four types of jeans available in stonewashed, faded, and black. How many combinations of style and color are available?
   A. 7   B. 9   C. 12   D. 16
   9. __________

10. What is the LCM of 6 and 10?
    F. 2   G. 60   H. 600   J. 30
    10. __________
11. **GARDENING** Mrs. Inez waters her vegetables every 2 days, her flowers every 4 days, and her fruit trees every 6 days. If she waters them all on the first day of spring, how many days pass before she has to water all three kinds again on the same day?

A. 2 days  
B. 6 days  
C. 12 days  
D. 48 days  

12. Which fraction is greater than \( \frac{1}{2} \) and less than \( \frac{3}{4} \)?

F. \( \frac{11}{12} \)  
G. \( \frac{7}{8} \)  
H. \( \frac{1}{3} \)  
J. \( \frac{2}{3} \)  

13. Which fraction is equal to \( \frac{6}{7} \)?

A. \( \frac{7}{8} \)  
B. \( \frac{24}{35} \)  
C. \( \frac{48}{56} \)  
D. \( \frac{13}{49} \)  

14. Order the fractions \( \frac{3}{4} \), \( \frac{1}{6} \), \( \frac{3}{8} \), and \( \frac{5}{8} \) from least to greatest.

F. \( \frac{1}{6} \), \( \frac{3}{8} \), \( \frac{1}{6} \), \( \frac{5}{8} \)  
G. \( \frac{1}{6} \), \( \frac{3}{8} \), \( \frac{3}{8} \), \( \frac{5}{8} \)  
H. \( \frac{3}{8} \), \( \frac{1}{6} \), \( \frac{5}{8} \), \( \frac{3}{8} \)  
J. \( \frac{1}{6} \), \( \frac{3}{8} \), \( \frac{3}{8} \), \( \frac{5}{8} \)  

15. Write 12.08 as a mixed number.

A. \( 12\frac{8}{10} \)  
B. \( 12\frac{4}{5} \)  
C. \( 12\frac{4}{25} \)  
D. \( 12\frac{2}{25} \)  

16. **WEATHER** Overnight it was so foggy that the measurable precipitation was 0.012 inch. Write 0.012 as a fraction in simplest form.

F. \( \frac{3}{25} \)  
G. \( \frac{6}{500} \)  
H. \( \frac{3}{250} \)  
J. \( \frac{6}{125} \)  

17. Write \( \frac{3}{8} \) as a decimal.

A. 0.35  
B. 0.275  
C. 0.375  
D. 0.25  

18. Write \( 6\frac{3}{20} \) as a decimal.

F. 6.12  
G. 6.3  
H. 6.1\overline{5}  
J. 6.15  

For Questions 19 and 20, use the coordinate plane below.

19. What ordered pair names point \( R \)?

A. (0, 2)  
B. (2, 1)  
C. (1, 3)  
D. (1, 2)  

20. What ordered pair names point \( T \)?

F. (5, 7)  
G. (4, 6)  
H. (7, 5)  
J. (6, 4)  

**Bonus** Write two numbers with a GCF of 7 and a LCM of 28.  

B: ____________________
Write the letter for the correct answer in the blank at the right of each question.

1. What is the GCF of 12 and 30?
   A. 60  B. 6  C. 3  D. 2  1. ____

2. What is the GCF of 12, 16, and 30?
   F. 60  G. 4  H. 3  J. 2  2. ____

3. RETAIL Sally is putting out 36 toy cars, 24 puppets, and 18 stuffed animals in a store display. If she puts the same number of toys in each row and if each row has only one type of toy, what is the greatest number of toys Sally can put in a row?
   A. 3  B. 6  C. 12  D. 18  3. ____

4. Replace the ◯ with a number so \( \frac{5}{9} = \frac{\text{◯}}{63} \).
   F. 30  G. 35  H. 40  J. 45  4. ____

5. Which of the fractions is not in simplest form?
   A. \( \frac{9}{25} \)  B. \( \frac{14}{27} \)  C. \( \frac{7}{8} \)  D. \( \frac{16}{34} \)  5. ____

6. MUSIC Leona has a music collection of 80 records. Of those records, 24 are country. Write a fraction in simplest form that compares the number of country records to the total number of records.
   F. \( \frac{6}{20} \)  G. \( \frac{24}{80} \)  H. \( \frac{4}{5} \)  J. \( \frac{3}{10} \)  6. ____

7. Write \( 6\frac{3}{5} \) as an improper fraction.
   A. \( \frac{33}{3} \)  B. \( \frac{90}{5} \)  C. \( \frac{33}{5} \)  D. \( \frac{18}{5} \)  7. ____

8. Write \( \frac{45}{7} \) as a mixed number.
   F. \( 7\frac{4}{7} \)  G. \( 6\frac{3}{7} \)  H. \( 6\frac{4}{7} \)  J. \( 6\frac{3}{45} \)  8. ____

9. SHOPPING A store sells three styles of sweaters available in navy, red, and tan. How many combinations of style and color are possible?
   A. 7  B. 9  C. 12  D. 16  9. ____

10. What is the LCM of 6 and 15?
    F. 3  G. 30  H. 90  J. 150  10. ____
11. **GARDENING** Mrs. Rodriguez waters her vegetables every 3 days, her flowers every 6 days, and her fruit trees every 9 days. If she waters them all on the first day of spring, how many days pass before she has to water all three kinds again on the same day?

A. 3 days  
B. 9 days  
C. 18 days  
D. 36 days

12. Which fraction is greater than $\frac{1}{4}$ and less than $\frac{1}{2}$?

F. $\frac{2}{3}$  
G. $\frac{5}{8}$  
H. $\frac{1}{5}$  
J. $\frac{5}{12}$

13. Which fraction is equal to $\frac{7}{8}$?

A. $\frac{8}{9}$  
B. $\frac{21}{40}$  
C. $\frac{35}{40}$  
D. $\frac{42}{54}$

14. Order the fractions $\frac{3}{4}$, $\frac{1}{3}$, $\frac{3}{8}$, and $\frac{5}{8}$ from least to greatest.

F. $\frac{1}{3}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{5}{8}$  
G. $\frac{3}{8}$, $\frac{1}{3}$, $\frac{3}{4}$, $\frac{5}{8}$  
H. $\frac{3}{8}$, $\frac{1}{3}$, $\frac{5}{3}$, $\frac{3}{8}$  
J. $\frac{1}{3}$, $\frac{3}{8}$, $\frac{5}{3}$, $\frac{3}{4}$

15. Write 14.06 as a mixed number.

A. $14\frac{6}{10}$  
B. $14\frac{3}{5}$  
C. $14\frac{3}{25}$  
D. $14\frac{3}{50}$

16. **WEATHER** Overnight it was so foggy that the measurable precipitation was 0.016 inch. Write 0.016 as a fraction in simplest form.

F. $\frac{4}{25}$  
G. $\frac{2}{125}$  
H. $\frac{4}{250}$  
J. $\frac{8}{500}$

17. Write $\frac{5}{8}$ as a decimal.

A. 0.65  
B. 0.625  
C. 0.675  
D. 0.525

18. Write $4\frac{7}{20}$ as a decimal.

F. 4.28  
G. 4.35  
H. 4.7  
J. 4.35

For Questions 19 and 20, use the coordinate plane below.

19. What ordered pair names point S?

A. (6, 4)  
B. (7, 4)  
C. (4, 6)  
D. (4, 7)

20. What ordered pair names point R?

F. (0, 6)  
G. (6, 0)  
H. (0, 5)  
J. (5, 0)

**Bonus** Write two numbers with a GCF of 3 and a LCM of 12.  
B: ___________________
For Questions 1 and 2, find the GCF of each set of numbers.

1. 15 and 21
2. 9 and 14

3. TREES Ms. Cole is planting 42 peach trees, 54 pear trees, and 48 plum trees in her orchard. If she puts the same number of trees in a row and if each row has only one type of tree, what is the greatest number of trees Ms. Cole can put in one row?

Replace the \( \cdot \) with a number so the fractions are equivalent.

4. \( \frac{6}{7} = \frac{\cdot}{42} \)
5. \( \frac{12}{28} = \frac{3}{\cdot} \)

For Questions 6 and 7, write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.

6. \( \frac{40}{35} \)
7. \( \frac{18}{48} \)
8. ANIMALS A giant panda eats up to 18 hours a day. Write a fraction in simplest form that compares the time spent eating to the total hours in a day.

Write each mixed number as an improper fraction.

9. \( 6 \frac{1}{5} \)
10. \( 4 \frac{2}{3} \)

For Questions 11 and 12, write each improper fraction as a mixed number.

11. \( \frac{48}{7} \)
12. \( \frac{29}{9} \)

13. MOVIES Tyler and three of his friends are going to see a movie. How many arrangements are there for all of them to sit in a row of four seats at the movie theater?
For Questions 14 and 15, find the LCM of each set of numbers.

14. 12 and 16

15. 5 and 7

16. MUSIC Callie is recording a rap song called “The Jungle Jubilee.” The rhythm section consists largely of animal noises. At the song’s start, all the creatures make noise. After that, the cricket chirps every 2 seconds, the monkey screeches every 8 seconds, and the bullfrog croaks every 12 seconds. How often can you hear these three creatures at the same time?

For Questions 17 and 18, replace each ⬜ with <, >, or = to make a true sentence.

17. \frac{2}{3} ⬜ \frac{11}{18}

18. \frac{14}{18} ⬜ \frac{7}{9}

19. Order the fractions \frac{3}{4}, \frac{2}{3}, \frac{5}{6}, and \frac{5}{7} from least to greatest.

Write each decimal as a fraction or mixed number in simplest form.

20. 0.024

21. 16.35

Write each fraction or mixed number as a decimal.

22. \frac{3}{16}

23. \frac{4}{25}

For Questions 24 and 25, use the coordinate plane at the right.

24. Graph and label point A(3, 5) on the coordinate plane.

25. Graph and label point B(0, 4) on the coordinate plane.

Bonus WEATHER It usually rains \frac{4}{50} of an inch more in El Paso than in Phoenix during the month of May. If the average May rainfall for Phoenix is 0.12 inch, how much does it rain in El Paso? Write this amount as a fraction in simplest form. (Hint: First write the fraction as a decimal.)
For Questions 1 and 2, find the GCF of each set of numbers.
1. 15 and 35
2. 9 and 16

3. TREES Mr. Smyth is planting 24 fir seedlings, 64 spruce seedlings, and 48 redwood seedlings in his field. If he plants the same number of seedlings in each row and if each row has only one type of seedling, what is the greatest number of seedlings he can put in one row?

Replace the ● with a number so that the fractions are equivalent.
4. \( \frac{4}{5} = \frac{●}{30} \)
5. \( \frac{12}{32} = \frac{3}{●} \)

For Questions 6 and 7, write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.
6. \( \frac{18}{24} \)
7. \( \frac{45}{64} \)

8. TIME Ken’s baby cousin sleeps about 16 hours each day. Write a fraction in simplest form that compares the time spent sleeping to the total hours in a day.

Write each mixed number as an improper fraction.
9. \( 4 \frac{1}{5} \)
10. \( 6 \frac{2}{3} \)

For Questions 11 and 12, write each improper fraction as a mixed number.
11. \( \frac{34}{7} \)
12. \( \frac{20}{9} \)

13. MOVIES Amelia and two of her friends are going to see a movie. How many arrangements are there for all of them to sit in a row of three seats at the movie theater?
For Questions 14 and 15, find the LCM of each set of numbers.

14. 12 and 18
15. 3 and 7

16. MUSIC Mara is recording a rap song called “The Barnyard Bash.” The rhythm section consists largely of animal noises. At the song’s start, all the animals make noise. After that, the cow moos every 2 seconds, the dog howls every 6 seconds, and the rooster crows every 16 seconds. How often can you hear these three animals at the same time?

For Questions 17 and 18, replace each • with <, >, or = to make a true sentence.

17. \( \frac{2}{3} \) • \( \frac{13}{18} \)
18. \( \frac{15}{21} \) • \( \frac{5}{7} \)

19. Order the fractions \( \frac{5}{6}, \frac{2}{3}, \frac{7}{9}, \) and \( \frac{7}{10} \) from least to greatest.

Write each decimal as a fraction or mixed number in simplest form.

20. 0.056
21. 12.45

Write each fraction or mixed number as a decimal.

22. \( \frac{5}{16} \)
23. \( \frac{42}{25} \)

For Questions 24 and 25, use the coordinate plane at the right.

24. Graph and label point \( A(7, 2) \) on the coordinate plane.
25. Graph and label point \( B(5, 0) \) on the coordinate plane.

Bonus WEATHER It usually rains \( \frac{3}{50} \) of an inch more in Bakersfield than in Los Angeles during the month of May. If the average May rainfall for Los Angeles is 0.14 inch, how much does it rain in Bakersfield? Write this amount as a fraction in simplest form. (Hint: First write the fraction as a decimal.)

B: ________________
For Questions 1–4, find the GCF of each set of numbers.

1. 24 and 42
2. 36 and 60
3. 21 and 25
4. 24, 48, and 72

5. FOOD Susan is making plates of appetizers. She has 14 pieces of ham, 35 pieces of cheese, and 70 olives. She wants to put only one type of appetizer on each plate, and she wants the same number on each plate. What is the greatest number of appetizers Susan can put on each plate?

For Questions 6–8, replace each ● with a number so the fractions are equivalent.

6. \( \frac{12}{54} = \frac{\bullet}{27} \)
7. \( \frac{28}{60} = \frac{7}{\bullet} \)
8. \( \frac{2}{3} = \frac{128}{\bullet} \)

9. TRAVEL It takes 36 minutes to drive to the beach 42 miles away. Express this as a fraction in simplest form.

For Questions 10–12, write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.

10. \( \frac{35}{55} \)
11. \( \frac{24}{31} \)
12. \( \frac{36}{60} \)

13. MAGAZINES Brad and Theresa are both reading a magazine that is 24 pages long. Brad is two-thirds of the way through the magazine, while Theresa is on page 18. Who is further along in the magazine?

Write each mixed number as an improper fraction.

14. \( 6\frac{3}{7} \)
15. \( 7\frac{2}{3} \)

Write each improper fraction as a mixed number.

16. \( \frac{35}{4} \)
17. \( \frac{37}{6} \)

Find the LCM of each set of numbers.

18. 6 and 14
19. 5 and 6
20. 8 and 10

21. NUMBER SENSE How many different arrangements are possible for the prime factors of 210?
ONLINE POLLS  For Questions 22–24, refer to the table.

22. Do more kids say they want to see into the future or become invisible?

23. Among those surveyed, which superpower is chosen most often?

24. Which superpower is chosen least often?

25. Order the fractions $\frac{5}{6}$, $\frac{3}{4}$, $\frac{13}{18}$, and $\frac{7}{12}$ from least to greatest.

Which Superpower Would You Choose?

<table>
<thead>
<tr>
<th>Superpower</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Read Minds</td>
<td>$\frac{7}{25}$</td>
</tr>
<tr>
<td>To Fly</td>
<td>$\frac{21}{100}$</td>
</tr>
<tr>
<td>To See into the Future</td>
<td>$\frac{1}{5}$</td>
</tr>
<tr>
<td>To Become Invisible</td>
<td>$\frac{9}{50}$</td>
</tr>
<tr>
<td>To Breath Under Water</td>
<td>$\frac{9}{100}$</td>
</tr>
<tr>
<td>To See at Night</td>
<td>$\frac{1}{25}$</td>
</tr>
</tbody>
</table>

Write each decimal as a fraction or mixed number in simplest form.

26. 0.275

27. 16.005

For Questions 28–30, write each fraction or mixed number as a decimal.

28. $\frac{5}{12}$

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

30. $8\frac{3}{16}$

31. TRANSPORTATION  Bus A arrives at the bus stop every 25 minutes. Bus B arrives at the bus stop every 30 minutes. Both buses are at the stop right now. In how many minutes will they both be at the stop again?

For Questions 32 and 33, use the coordinate plane at the right.

32. Graph and label point $A(2\frac{1}{2}, 0)$ on the coordinate plane.

33. Graph and label point $B(1, 1.75)$ on the coordinate plane.

Bonus  Two numbers have a GCF of 4 and a LCM of 24. What are the two numbers?
Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solution in more than one way or investigate beyond the requirements of the problem. If necessary, record your answer on another piece of paper.

<table>
<thead>
<tr>
<th>Average Monthly Rainfall (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
</tr>
<tr>
<td>November</td>
</tr>
<tr>
<td>December</td>
</tr>
<tr>
<td>January</td>
</tr>
<tr>
<td>February</td>
</tr>
</tbody>
</table>

For Questions 1–3, use the table that shows average winter monthly rainfall.

1. Use the part of the table that shows the rainfall for River City.
   a. Write River City’s rainfall in simplest form for each month. Show your work.

   b. Put the four fractions for rainfall in order from least to greatest. Explain how you found your answer.

2. Use the part of the table that shows the rainfall for Lakeview.
   a. Write Lakeview’s rainfall for November and December as improper fractions. Explain how you found your answers.

   b. Write Lakeview’s rainfall for January and February as mixed numbers. Explain how you found your answers.

3. Use the part of the table that shows the rainfall for Gilmore.
   a. Write the decimals for the rainfall in November and December as fractions or mixed numbers in simplest form. Show your work.

   b. Write the fraction for the rainfall in January as a decimal. Use the paper and pencil method and show your work. What type of decimal is this?

4. A lumber company is planting tree seedlings. There are 16 redwood, 32 spruce, and 48 fir seedlings. The seedlings will be planted in rows with the same number of each type of seedling in each row. Find the greatest number of seedlings that can be placed in each row. Show your work.
1. What is the value of $24 \div (3 + 5) \times 2 + 1$? (Lesson 1-4)
   A 7  B 9  C 19  D 27

2. FLOWERS The line graph at the right shows monthly flower sales. In which month did sales increase the most from the previous month? (Lesson 2-2)
   F June  H March  G May  J February

3. SCHOOL The range of student test scores is 39 points. If the low score is 58 points, what is the high score? (Lesson 2-7)
   A 19  B 48.5  C 87  D 97

4. Write ninety-two and thirty-six thousandths in decimal form. (Lesson 3-1)
   F 0.9236  G 92.36  H 92.036  J 92.0036

5. Which number is greater than 22.42 but less than 23.21? (Lesson 3-2)
   A 22.096  B 33.1  C 23.615  D 23.204

6. Round 8.275 to the nearest tenth. (Lesson 3-3)
   F 8.3  G 8.28  H 8.2  J 8

7. What is the sum of 31.63 + 68.74? (Lesson 3-5)
   A 719.03  B 104.87  C 100.37  D 37.11

8. MONEY On his newspaper route, Tom collects $48 on Monday, $36 on Tuesday, and $18 on Wednesday. What is the most each person pays for a subscription if each customer pays the same amount? (Lesson 4-1)
   F $3  G $4  H $6  J $12

9. ROCKS Taro has 400 rocks in his rock collection. Of these, 80 are agates. What fraction of Taro’s rocks are not agates? (Lesson 4-2)
   A $\frac{2}{5}$  B $\frac{4}{5}$  C $\frac{3}{5}$  D $\frac{1}{5}$
10. What is the LCM of 3, 6, and 9? (Lesson 4-5)
   F 3  G 9  H 18  J 36

   **10. J**

11. SKATING Sashi and her brother start skating at the same time.
    Sashi goes around the rink once every 4 minutes. Her brother
    goes around once every 10 minutes. How many minutes will it
    be before they will both meet back at their starting place?
    (Lesson 4-5)
    A 14  B 20  C 40  D 60

   **11. H**

12. Order the fractions $\frac{1}{2}$, $\frac{5}{6}$, $\frac{2}{3}$, and $\frac{3}{4}$ from least to greatest.  
    (Lesson 4-6)
    F $\frac{1}{2}$  G $\frac{2}{3}$  H $\frac{3}{4}$  J $\frac{5}{6}$

   **12. G**

13. MONEY Mischa agreed to pay each of her friends $4.75
    to help her set up for the garage sale. If 5 friends helped,
    how much total money did she pay them? (Lesson 3-6)
    A $20.75  B $23.75  C $22.50  D $23.50

   **13. A**

---

Part 2: Short Response

**Instructions:** Write your answers to each question in the space provided.

14. Twenty students take a math test. The highest score is
    98 points, and the range is 39. What is the lowest score?
    (Lesson 2-7)

15. Write $15\frac{3}{4}$ as a decimal. (Lesson 4-8)
16. Find the next three numbers in the pattern 52, 46, 40, __, __, __. (Lesson 1-1)

17. Write 12.863 in word form. (Lesson 3-1)

18. Scientists estimate that an average of 5.708 species become extinct each day. Round this number to the nearest one. (Lesson 3-3)

19. WOODWORKING A board is 8.5 feet in length. How much needs to be cut off to get a board that is 4.75 feet long? (Lesson 3-5)

20. Find the LCM of 16 and 24. (Lesson 4-5)

21. A board is divided into rectangles, each \( \frac{2}{15} \) inch long. What is the length of one rectangle written as a decimal? (Lesson 4-8)

22. Graph the point \( X(1.5, 1) \) on the coordinate plane at the right. (Lesson 4-9)

23. Hahnee makes stepping stones by mixing \( \frac{11}{8} \) pounds of white rock with 1.275 pounds of cement for each stone.

   a. Write the pounds of white rock as a mixed number. (Lesson 4-3)

   b. Write the pounds of white rock as a decimal. (Lesson 4-8)

   c. How much will one stone weigh? Write this weight as a mixed number in simplest form. (Lesson 4-7)
### Anticipation Guide

**Fractions and Decimals**

**Before you begin Chapter 4**

- Read each statement.
- Decide whether you Agree (A) or Disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (Not Sure).

<table>
<thead>
<tr>
<th>STEP 1 A, D, or NS</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The greatest common factor of two numbers can be found by listing all factors of both numbers.</td>
<td>A</td>
</tr>
<tr>
<td>2.</td>
<td>The greatest common factor of two numbers is always less than both numbers.</td>
<td>D</td>
</tr>
<tr>
<td>3.</td>
<td>Two fractions are equivalent only if their numerators are the same and their denominators are the same.</td>
<td>D</td>
</tr>
<tr>
<td>4.</td>
<td>A fraction is in simplest form only when the greatest common factor of the numerator and denominator is 1.</td>
<td>A</td>
</tr>
<tr>
<td>5.</td>
<td>$\frac{7}{5}$ is an example of a mixed number.</td>
<td>D</td>
</tr>
<tr>
<td>6.</td>
<td>Improper fractions can be rewritten as mixed numbers.</td>
<td>A</td>
</tr>
<tr>
<td>7.</td>
<td>A multiple of a number is always divisible by the number.</td>
<td>A</td>
</tr>
<tr>
<td>8.</td>
<td>When comparing two fractions, the greater fraction is always the fraction with the greater denominator.</td>
<td>D</td>
</tr>
<tr>
<td>9.</td>
<td>To write a fraction as a decimal, divide the denominator into the numerator.</td>
<td>A</td>
</tr>
<tr>
<td>10.</td>
<td>To write the decimal 0.32 as a fraction, first write 32 over one thousand, then simplify.</td>
<td>D</td>
</tr>
<tr>
<td>11.</td>
<td>Since 8 does not divide evenly into 7, it is not possible to write $\frac{7}{8}$ as a decimal.</td>
<td>D</td>
</tr>
<tr>
<td>12.</td>
<td>On the coordinate plane, the x-axis is horizontal and the y-axis is vertical.</td>
<td>A</td>
</tr>
</tbody>
</table>

### Lesson Reading Guide

**Greatest Common Factor**

**Get Ready for the Lesson**

Read the introduction at the top of page 197 in your textbook. Write your answers below:

1. Who participated in swimming only? Tyler and Sonia
2. Who participated in crafts only? Savannah, Luis, and Miko
3. Who participated in both swimming and crafts? Owen and Isabel

**Read the Lesson**

4. Look at the diagram at the top of page 197 in your textbook. What does a Venn diagram do? **Sample answer:** It uses overlapping circles to show elements that are common to the elements listed in each circle.

For Exercises 5–8, use the Venn diagram in Example 2 at the top of page 198.

5. What elements are listed in the circle on the left? **Sample answer:** all the factors of the number 42
6. What does the name tell you about each of the numbers inside the circle on the left? **Sample answer:** Each number can be multiplied by some other number and result in a product of 42.
7. What does the area where the two circles overlap represent? **Sample answer:** the factors of 42 and 56 that are the same
8. What does GCF mean and what is the GCF of 60 and 54? **GCF** stands for greatest common factor, the greatest factor that is common to two or more numbers; 6

**Remember What You Learned**

9. Work with a partner to find the GCF for these two sets of numbers: 12 and 13, and 14 and 42. Have one partner find each GCF by listing factors. Have the other partner find each GCF by using prime factors. Then exchange papers and check each other’s work. 1, 14
Lesson 4–1

**Identify the common factors of each set of numbers.**

1. 12 and 20  
   2. 24 and 30  
   3. 18 and 27  
   4. 10 and 25  
   5. 6 and 21  
   6. 14 and 42

1, 2, 4  
1, 2, 3, 6  
1, 3, 9  
1, 5  
1, 3  
1, 2, 7, 14

**Find the GCF of each set of numbers.**

7. 15 and 40  
   8. 16 and 36  
   9. 12 and 54  
   10. 24 and 64  
   11. 39 and 26  
   12. 35 and 63

5  
4  
6  
8  
13  
7

**Find the GCF of each set of numbers by making a list.**

1. 8 and 12  
2. 10 and 15  
3. 81 and 27

8: 1, 2, 4, 8  
10: 1, 2, 5, 10  
81: 1, 3, 9, 27, 81

12: 1, 2, 3, 4, 6, 12  
15: 1, 3, 5, 15  
27: 1, 3, 9, 27

GCF: 4  
GCF: 5  
GCF: 27

**Find the GCF of each set of numbers by using prime factors.**

4. 15 and 20  
5. 6 and 12  
6. 28 and 42

15 = 3 x 5  
6 = 2 x 3  
28 = 2 x 2 x 7

20 = 2 x 2 x 5  
12 = 2 x 2 x 3  
42 = 2 x 3 x 7

GCF: 5  
GCF: 6  
GCF: 14

**Find the GCF of each set of numbers.**

7. 21 and 9  
8. 15 and 17  
9. 54 and 81

10. 30 and 45  
11. 44 and 55  
12. 35, 20, and 15
Answers

Lesson 4-1

Greatest Common Factor

1. Identify the common factors of each set of numbers.
   1. 12 and 20
      \[1, 2, 4, 10, 20\]
   2. 12, 24, 36
      \[1, 2, 3, 4, 6, 12\]
   3. 15, 33, 45
      \[1, 3, 15\]

2. Find the GCF of each set of numbers.
   1. 12 and 30
      \[6\]
   2. 50 and 40
      \[10\]
   3. 28, 42, 56
      \[14\]
   4. 14, 56, 63
      \[7\]
   5. 9, 21, 60
      \[3\]

3. Find three numbers whose GCF is the indicated value.
   1. 3
      Sample answer: 3, 9, 12
   2. 16
      Sample answer: 16, 32, 48
   3. 18
      Sample answer: 18, 36, 54

4. TOYS For Exercises 13 and 14, use the following information.
   A store is organizing toys into bins. The toys must be put into bins such that each bin contains the same number of toys without mixing the toys.

   13. What is the greatest number of toys that can be put in a bin? 12 toys

   14. How many bins are needed for each type of toy? airplanes: 3 bins; boats: 6 bins; cars: 5 bins

5. MONEY The list shows the amounts of money the club leader collected from members for a camping trip. Each member paid the same amount. What is the most the camping trip could cost per member? Explain. $18; The GCF of 36, 54, and 72 is 18.

6. MONEY Use the information from Exercise 5. How many members have paid to go on the camping trip if the price is the greatest possible price per member? 9 members
Lesson 4–2

Get Ready for the Lesson

Read the introduction at the top of page 204 in your textbook. Write your answers below.

1. How many kittens are at the pet store? 12

2. How many Siamese kittens are there? 4

Read the Lesson

3. The word equivalent [ih-KWIH-vuh-luhnt] means “equal in quantity, strength, value, and so forth.” What are equivalent fractions?
   Fractions that have the same value

4. How can you find equivalent fractions?
   You can multiply or divide the numerator and denominator of a fraction by the same nonzero number.

5. Which of the following fractions are equivalent? How can you tell?
   Sample answer: The first two fractions are equivalent; if you multiply the numerator and denominator of \( \frac{5}{27} \) by 3, you get \( \frac{15}{27} \).

6. How can you tell if a fraction is in simplest form?
   Sample answer: The GCF of its numerator and denominator is 1.

7. What are two ways you can use to write a fraction in simplest form?
   1) Divide the numerator and denominator by common factors until the only common factor is 1.
   2) Divide the numerator and denominator by the GCF.

Remember What You Learned

8. Look at the table at the top of page 204 in your textbook. Write a fraction that shows how many of the total number of kittens found at a local pet store are Persian. Write an equivalent fraction that uses greater numbers. Write the fraction in simplest form. Be sure to show all your work.
   Sample answer: \( \frac{2}{12} \cdot \frac{4}{24} = \frac{1}{6} \). See students’ work.
Simplifying Fractions

1. Replace the  with a number so the fractions are equivalent.

Since \( 2 \times 5 = 10 \), multiply the numerator and denominator by 5.

\[
\frac{1}{2} \times 5 = \frac{5}{10}
\]

\[
\frac{3}{10}
\]

Example 2

Write \( \frac{12}{30} \) in simplest form.

The GCF of 12 and 30 is 6.

\[
\frac{12}{30} = \frac{12 \div 6}{30 \div 6} = \frac{2}{5}
\]

The GCF of 2 and 5 is 1, so \( \frac{2}{5} \) is in simplest form.

Exercises

Replace each  with a number so the fractions are equivalent.

1. \( \frac{1}{5} = \frac{3}{15} \)  
2. \( \frac{12}{18} = \frac{2}{3} \)  
3. \( \frac{6}{14} = \frac{3}{7} \)

Write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.

4. \( \frac{6}{30} = \frac{1}{5} \) simplest form  
5. \( \frac{8}{3} \) simplest form  
6. \( \frac{3}{8} \) simplest form

7. \( \frac{21}{28} = \frac{3}{4} \) simplest form  
8. \( \frac{15}{30} = \frac{1}{2} \) simplest form  
9. \( \frac{7}{10} \) simplest form
Practice

Simplifying Fractions

Replace each @ with a number so the fractions are equivalent.

1. \( \frac{1}{3} = \frac{6}{18} \)  
2. \( \frac{1}{4} = \frac{9}{16} \)  
3. \( \frac{2}{3} = \frac{8}{12} \)  
4. \( \frac{8}{16} = \frac{1}{2} \)

5. \( \frac{1}{2} = \frac{16}{32} \)  
6. \( \frac{12}{21} = \frac{4}{7} \)  
7. \( \frac{30}{36} = \frac{5}{6} \)  
8. \( \frac{28}{42} = \frac{2}{3} \)

Write each fraction in simplest form. If the fraction is already in simplest form, write simplest form.

9. \( \frac{7}{28} = \frac{1}{4} \)  
10. \( \frac{9}{15} = \frac{3}{5} \)  
11. \( \frac{10}{42} = \frac{5}{21} \)

12. \( \frac{12}{42} = \frac{2}{7} \)  
13. \( \frac{17}{28} \) simplest form  
14. \( \frac{24}{64} = \frac{3}{8} \)

Write two fractions that are equivalent to the given fraction.

15. \( \frac{3}{10} \)  
16. \( \frac{7}{13} \)  
17. \( \frac{15}{33} \)  
Sample answer: \( \frac{12}{40} \)  
Sample answer: \( \frac{14}{28} \)  
Sample answer: \( \frac{20}{60} \)  
Sample answer: \( \frac{12}{33} \)  
Sample answer: \( \frac{26}{52} \)  
Sample answer: \( \frac{20}{60} \)

18. ANIMALS In Ms. Reyes’ class, 4 out of the 30 students had guinea pigs as pets. Express this fraction in simplest form.

\( \frac{2}{15} \)

19. ANALYZE GRAPHS The bar graph shows the number of titles held by the top seven women Wimbledon tennis champions. In simplest form, what fraction of the number of titles is held by Steffi Graf?

\( \frac{1}{7} \)

Word Problem Practice

Simplifying Fractions

For Exercises 1–3, use the following information and the table at the right. Write your answers in simplest form.

In a frequency table, the relative frequency of a category is the fraction of the data that falls in that class.

To find relative frequency, divide the frequency by the total number of items.

1. STATISTICS What is the relative frequency of people with brown eyes?

\( \frac{2}{5} \)

2. STATISTICS What is the relative frequency of people with hazel eyes?

\( \frac{4}{15} \)

3. STATISTICS What is the relative frequency of people with brown or hazel eyes?

\( \frac{2}{3} \)

4. ANIMALS Lions sleep about 20 hours a day. Write \( \frac{20}{24} \) as a fraction in simplest form.

\( \frac{5}{6} \)

5. MARBLES Carlota has 63 marbles. Twenty-eight of her marbles are aggies. What fraction of Carlota’s marbles are aggies? Write the answer in simplest form.

\( \frac{4}{9} \)

6. MOVIES Fourteen of the top thirty all-time grossing children’s films were animated films. Write \( \frac{14}{30} \) as a fraction in simplest form.

\( \frac{7}{15} \)
**TI-73 Activity**

**Simplifying Fractions**

Use the simplification key, \( \text{SIMP} \), on your calculator to help simplify fractions.

**Example**

Write \( \frac{24}{36} \) in simplest form.

**Method A**

1. Turn on \( \text{numsimp} \).
2. Enter the fraction.
   
   Keys: \(24 \boxed{\text{b}} 36 \boxed{\text{ENTER}}\)  
   Display: \(\frac{2}{3}\)

**Method B**

You can enter the factor yourself. Choose a number that divides both the numerator and the denominator. (If you choose a number that does not divide them both, the fraction will not change.)

**Sample answers:** \(\frac{11}{13} \) or \(\frac{13}{11}\)

1. My numerator is divisible by 3.  
   My denominator is 4 less than twice my numerator.  
   My numerator is one less than my denominator.

   **Sample answer:** \(\frac{12}{20}\)

2. My numerator is a one-digit prime number.  
   My denominator is a one-digit composite number.

   **Sample answer:** \(\frac{6}{15}\)

3. My numerator is 6 less than my denominator.  
   I am equivalent to \(\frac{3}{5}\).

4. The GCF of my numerator and denominator is 3.  
   I am equivalent to \(\frac{2}{6}\).

5. My numerator and denominator are prime numbers.  
   My numerator is one less than my denominator.

   **Sample answer:** \(\frac{2}{3}\)

6. My numerator and denominator are prime numbers.  
   The sum of my numerator and denominator is 24.

   **Sample answers:** \(\frac{11}{13}\) or \(\frac{13}{11}\)

7. My numerator is divisible by 3.  
   My denominator is divisible by 5.  
   My denominator is 4 less than twice my numerator.

   **Sample answer:** \(\frac{6}{15}\)

8. My numerator is divisible by 3.  
   My denominator is divisible by 5.  
   My denominator is 3 more than twice my numerator.

9. My numerator is a one-digit prime number.  
   My denominator is a one-digit composite number.  
   I am equivalent to \(\frac{8}{32}\).

   **Sample answer:** \(\frac{2}{8}\)

10. My numerator is a prime number.  
    The GCF of my numerator and denominator is 2.  
    I am equivalent to \(\frac{1}{5}\).

11. **Challenge** Make up your own mystery like the ones above. Be sure that there is only one solution. To check, have a classmate solve your mystery.  
    **Answers may vary.**
Lesson 4–3

Lesson Reading Guide

Mixed Numbers and Improper Fractions

Get Ready for the Lesson
Complete the Mini Lab at the top of page 209 in your textbook. Write your answers below.
1. How many shaded $\frac{1}{4}$s are there? 5
2. What fraction is equivalent to $1\frac{1}{2}$? $\frac{3}{2}$

Make a model to show each number:
3. the number of thirds in $2\frac{2}{3}$
4. the number of halves in $4\frac{1}{2}$

Read the Lesson
5. What is a mixed number? Write three examples. Sample answer: A whole number and a fraction written together that indicates the sum of the whole number and the fraction; $4\frac{3}{5}$, $6\frac{1}{2}$, $1\frac{7}{12}$
6. You read $4\frac{1}{6}$ as four and one-sixth. How do you read the following mixed numbers: $3\frac{3}{5}$, $2\frac{2}{3}$, $8\frac{1}{2}$, three and three-fifths; two and two-thirds; eight and one-half

What is an improper fraction? Write three examples.
Sample answer: An improper fraction is one in which the numerator is greater than or equal to the denominator; $\frac{11}{8}$, $\frac{13}{5}$, $\frac{13}{6}$

Remember What You Learned
8. Work with a partner. Have one person show the other how to write a mixed number as an improper fraction. Then have the other partner show how to write an improper fraction as a mixed number. See students’ work.

Example 1
Write $2\frac{1}{3}$ as an improper fraction.
$2\frac{1}{3} = 2 \times \frac{3}{3} + \frac{1}{3} = \frac{7}{3}$
Think: $2 \times 3 - 6 + 1 = 7$

Check: Use a model.

Example 2
Write $\frac{9}{4}$ as a mixed number.
Divide 9 by 4. Use the remainder as the numerator of the fraction.
$\frac{9}{4} = \frac{21}{16}$
So, $\frac{9}{4}$ can be written as $2\frac{1}{4}$.

Exercises
Write each mixed number as an improper fraction.
1. $\frac{3}{8}$, $\frac{25}{8}$
2. $\frac{24}{5}$, $\frac{14}{5}$
3. $\frac{21}{2}$, $\frac{5}{2}$
4. $\frac{7}{3}$, $\frac{5}{3}$
5. $\frac{29}{9}$, $\frac{19}{9}$
6. $\frac{77}{10}$, $\frac{37}{10}$
7. $\frac{13}{8}$, $\frac{19}{8}$
8. $\frac{13}{4}$, $\frac{7}{4}$

Write each improper fraction as a mixed number or a whole number.
9. $\frac{7}{4}$, $\frac{3}{4}$
10. $\frac{5}{3}$, $\frac{12}{3}$
11. $\frac{3}{2}$, $\frac{11}{8}$
12. $\frac{13}{8}$
13. $\frac{22}{5}$, $\frac{4}{5}$
14. $\frac{15}{15}$, $\frac{3}{15}$
15. $\frac{25}{4}$, $\frac{6}{4}$
16. $\frac{16}{3}$, $\frac{5}{3}$
Skills Practice

Mixed Numbers and Improper Fractions

Draw a model for each mixed number. Then write the mixed number as an improper fraction.

1. \(4 \frac{3}{5} \)

2. \(3 \frac{3}{4} \)

3. \(2 \frac{2}{3} \)

Write each mixed number as an improper fraction.

4. \(6 \frac{1}{2} = \frac{13}{2} \)
5. \(1 \frac{5}{6} = \frac{11}{6} \)
6. \(3 \frac{3}{8} = \frac{13}{8} \)
7. \(9 \frac{1}{3} = \frac{10}{3} \)
8. \(3 \frac{7}{8} = \frac{31}{8} \)
9. \(2 \frac{1}{4} = \frac{9}{4} \)
10. \(2 \frac{5}{9} = \frac{26}{9} \)
11. \(4 \frac{5}{6} = \frac{29}{6} \)
12. \(8 \frac{3}{5} = \frac{43}{5} \)
13. \(5 \frac{4}{7} = \frac{39}{7} \)
14. \(10 \frac{2}{3} = \frac{32}{3} \)
15. \(9 \frac{1}{4} = \frac{37}{4} \)

Write each improper fraction as a mixed number or a whole number.

16. \( \frac{13}{2} = 6 \frac{1}{2} \)
17. \( \frac{11}{6} = 1 \frac{5}{6} \)
18. \( \frac{13}{4} = 3 \frac{3}{4} \)
19. \( \frac{17}{8} = 2 \frac{1}{8} \)
20. \( \frac{3}{6} = 1 \frac{1}{2} \)
21. \( \frac{27}{20} = 1 \frac{7}{20} \)
22. \( \frac{28}{2} = 14 \frac{1}{2} \)
23. \( \frac{31}{7} = 4 \frac{3}{7} \)
24. \( \frac{52}{9} = 5 \frac{7}{9} \)
25. \( \frac{41}{3} = 13 \frac{2}{3} \)
26. \( \frac{37}{5} = 7 \frac{2}{5} \)
27. \( \frac{77}{8} = 9 \frac{5}{8} \)

5. \(6 \frac{1}{4} = \frac{25}{4} \)
6. \(5 \frac{3}{5} = \frac{28}{5} \)
7. \(8 \frac{1}{9} = \frac{73}{9} \)
8. \(6 \frac{3}{4} = \frac{27}{4} \)

9. **SNAKES** The garden snake that Fumiko measured was \(7 \frac{3}{4}\) inches long. Write the length as an improper fraction. \(\frac{31}{4}\)

10. Express four and seven eighths as an improper fraction. \(\frac{39}{8}\)

11. \(13 \frac{1}{4} = \frac{55}{4} \)
12. \(11 \frac{1}{10} = \frac{111}{10} \)
13. \(10 \frac{3}{5} = \frac{53}{5} \)
14. \(\frac{21}{7} = 3 \frac{2}{7} \)
15. \(6 \frac{14}{14} = 7 \)
16. \(\frac{2}{8} = 1 \)

17. **TREES** A nursery is growing trees. Find the height of each tree in terms of feet. Write your answer as a mixed number in simplest form.

- **apricot** \(6 \frac{1}{12} \)
- **peach** \(5 \frac{1}{6} \)
- **pear** \(4 \frac{1}{2} \)
- **plum** \(5 \frac{2}{3} \)

**Trees in Nursery**

<table>
<thead>
<tr>
<th>Tree</th>
<th>Height (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricot</td>
<td>73</td>
</tr>
<tr>
<td>Peach</td>
<td>62</td>
</tr>
<tr>
<td>Pear</td>
<td>54</td>
</tr>
<tr>
<td>Plum</td>
<td>68</td>
</tr>
</tbody>
</table>
In the following recipes, some mixed numbers have been changed to improper fractions. Rewrite each recipe as you would expect to find it in a cookbook.

Quick Pizza Crust
2 cups flour
1/2 cup sugar
1/4 cup water
2 tablespoons yeast
1 teaspoon salt
8 tablespoons oil
2 cups rolled oats
1/4 cup butter
1/2 cup sesame seeds
1/8 cup sunflower seeds
3 eggs
8 cups brown sugar

Chocolate Chips
3/4 cups flour
2 cups brown sugar
4 cups rolled oats
1 cup chocolate chips
1 tablespoon baking powder
3/4 cup honey
1 cup rolled oats
2 cups flour
1/3 cup brown sugar
1/2 cup margarine
1/4 cup oil
1/4 cup baking powder
1 teaspoon salt
2 cups rolled oats
2 cups sunflower seeds
3/4 cup chocolate chips
2 tablespoons oil
1/4 cup brown sugar

Karlo can run 4 3/4 miles before he is too tired to keep going. Write the distance he can run as an improper fraction.

It is common to see mixed fractions in recipes. A recipe for a pizza crust may ask for 1/2 cup flour. You could measure this amount in two ways. You could fill a one-cup measuring cup with flour and a one-half-cup measuring cup three times, because 1/2 is the same as 3/6.

1. Kilani’s puppy weighs 4 1/2 pounds. Write the puppy’s weight as a mixed number.
2. Steinswam 7 1/4 miles away from Frisco. Write the distance as an improper fraction.
3. Winifred’s favorite recipe calls for 1 1/4 cups of flour. Write the amount of flour needed as an improper fraction.
4. Hampshire Hill is 9 1/4 miles tall. Write the height as a mixed number.
5. Koto can run 4 1/2 miles before she is too tired to keep going. Write the distance she can run as an improper fraction.

Mixed Numbers and Improper Fractions

Enrichment

Recipe

Apple Crunch
2 cups flour
2 cups brown sugar
2 cups oatmeal
2 cups flour
1 cup water
3 1/2 teaspoons yeast
3 1/4 cups sugar
2 1/2 teaspoons salt
3 teaspoons sugar
1/2 cup oil
2 sticks margarine
1 1/2 cups sesame seeds
1 1/2 cups sunflower seeds
2 cups chocolate chips

It is common to see mixed fractions in recipes. A recipe for a pizza crust may ask for 1/2 cup flour. You could measure this amount in two ways. You could fill a one-cup measuring cup with flour and a one-half-cup measuring cup three times, because 1/2 is the same as 3/6.

1. Kilani’s puppy weighs 4 1/2 pounds. Write the puppy’s weight as a mixed number.
2. Steinswam 7 1/4 miles away from Frisco. Write the distance as an improper fraction.
3. Winifred’s favorite recipe calls for 1 1/4 cups of flour. Write the amount of flour needed as an improper fraction.
4. Hampshire Hill is 9 1/4 miles tall. Write the height as a mixed number.
5. Koto can run 4 1/2 miles before she is too tired to keep going. Write the distance she can run as an improper fraction.
Lesson 4–4

Problem-Solving Investigation: Make an Organized List

Example 1

ELECTIONS Tyler, McKayla, and Kareem are running for student council office. The three positions they could be elected for are president, treasurer, and secretary. How many possible ways could the three of them be elected?

Understand You know there are three positions and three students to fill the positions. You need to know the number of possible arrangements for them to be elected.

Plan Make a list of all the different possible arrangements. Use T for Tyler, M for McKayla, and K for Kareem.

Solve

<table>
<thead>
<tr>
<th>President</th>
<th>T</th>
<th>T</th>
<th>K</th>
<th>K</th>
<th>M</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasurer</td>
<td>M</td>
<td>K</td>
<td>M</td>
<td>T</td>
<td>T</td>
<td>K</td>
</tr>
<tr>
<td>Secretary</td>
<td>K</td>
<td>M</td>
<td>T</td>
<td>M</td>
<td>K</td>
<td>T</td>
</tr>
</tbody>
</table>

Check Check the answer by seeing if each student is accounted for in each situation.

Exercise

SHOPPING Khuan has to stop by the photo store, the gas station, the grocery store, and his grandmother’s house. How many different ways can Khuan make the stops?

Solve. Use the make an organized list strategy.

1. BACKPACKS A department store sells three different styles of backpacks. Each style comes in navy, black, or red. How many different backpacks are available?

2. MUSIC A popular band has two of their concerts each available on tape, CD, DVD, and VHS. How many different items do they have available for these two concerts?

3. MANUFACTURING A candle factory makes 8 different candle scents available in a votive candle, pillar candle, or jar candle. How many combinations of scent and type of candle are possible?

4. AWARD CEREMONY For an awards ceremony, the school principal, vice principal, athletic director, and student council president are all sitting on the stage. How many arrangements are there for all of them to sit on the stage?
Chapter 4

Mixed Problem Solving

Use the make an organized list strategy to solve Exercises 1 and 2.

1. FLAGS Randy wants to place the flag of each of 3 countries in a row on the wall for an international fair. How many arrangements are possible? 6

2. KITES A store sells animal kites, box kites, and diamond kites in four different colors. How many combinations of kite type and color are possible? 12

Answer the following problem. Use any strategy to solve Exercises 3–7. Some strategies are shown below.

Problem-Solving Strategies
• Make a table
• Guess and check

3. SHIRTS A mail-order company sells 4 styles of shirts in 6 different colors. How many combinations of style and color are possible? 24

4. PATTERNS If the pattern continues, how many small squares are in the fifth figure of this pattern? 25

Complete the following problems. Use any strategy to solve Exercises 3–7.

5. FOOD Is $6 enough money to buy a head of lettuce for $0.99, two pounds of tomatoes for $2.38, and two pounds of avocados for $2.78? No, $6 is not enough.

6. MONEY Nikki earns $45 a week pet sitting. How much does she earn each year? $2,340

7. WRITING The number of magazine articles Nora sold in her first four years is shown. At this rate, how many articles will she sell in the fifth year?

<table>
<thead>
<tr>
<th>Year</th>
<th>Number Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
</tr>
</tbody>
</table>

Year 1 2 3 4 5
Number 2 4 7 11 ?

16

1. GEOMETRY Find the difference in the areas of the square and rectangle. $12 \text{ ft}^2$

2. ICE CREAM Meagan is taking the kids she is babysitting to the local ice cream parlor. If she has $7, does she have enough money for two ice cream sandwiches, one sundae, and one scoop of ice cream? Yes; $2 + 3 + 1 = 6$

<table>
<thead>
<tr>
<th>Ice Cream Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>One scoop</td>
</tr>
<tr>
<td>Two scoops</td>
</tr>
<tr>
<td>Ice cream sandwich</td>
</tr>
<tr>
<td>Ice cream sundae</td>
</tr>
</tbody>
</table>

3. FUND-RAISER The school band is selling cookie dough for a fund-raiser. A tub of cookie dough sells for $12, a pack of dry cookie mix sells for $5, and drop cookie dough sells for $15 a pack. If the school band sells 24 tubs, 15 dry mixes, and 30 packs of drop cookie dough, how much money will they collect? $813

4. SHOPPING At a sports store, Curtis bought some baseball card packs and some T-shirts. The baseball card packs cost $3 each and the T-shirts cost $8 each. If Curtis spent $30, how many baseball card packs and how many T-shirts did he buy? 2 baseball card packs and 3 T-shirts

5. LANGUAGE ARTS On Monday, 86 science fiction books were sold at a book sale. This is 8 more than twice the amount sold on Thursday. How many science fiction books were sold on Thursday?

$39$

6. PATTERNS What number is missing in the pattern . . , 234, 345, ? , 567, . . .? 456
Get Ready for the Lesson

Read the introduction at the top of page 216 in your textbook. Write your answers below.

1. Which of the products of 2 are the products of 3? 6, 12
2. Find the least number that is a product of both 2 and 3. 6

Read the Lesson

Look at Example 1 on page 216. Complete each sentence.

3. The multiples 8, 16, and 24 are found on the lists of multiples for both 8 and 4. They are multiples that are common to both 8 and 4. Multiples that are common to both 8 and 4 are ____________ of 8 and 4.
4. The smallest multiple that is on the list for both 8 and 4 is 8. It has the least value of all the multiples that 8 and 4 have in common. This smallest common multiple is the ____________ of 8 and 4.

Look at Example 2 on page 217. Complete each sentence.

5. A prime factor is a factor that is a ________________.
6. The example says to use each common prime factor once and then any remaining prime factors. The common prime factor in the example is 5 because ________________.

Remember What You Learned

7. Work with a partner to find the least common multiple of 8 and 12. Have one person find the LCM by making a list and have the other by using prime factors. Then exchange papers and check each other’s work. 24; See students’ work.

Exercises

Identify the first three common multiples of each set of numbers.

1. 2 and 4
2. 5 and 10
3. 2 and 7
4. 8, and 12
5. 10, 20, and 30
6. 14, 28, and 42

Find the LCM of each set of numbers.

4. 5 and 6
5. 6 and 9
6. 4 and 10
7. 9 and 27
8. 4 and 6
9. 5 and 7
### Answers (Lesson 4-5)

**Lesson 4–5**

**Identify the first three common multiples of each set of numbers.**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2 and 6</td>
<td>6, 12, and 18</td>
</tr>
<tr>
<td>2.</td>
<td>3 and 6</td>
<td>6, 12, and 18</td>
</tr>
<tr>
<td>3.</td>
<td>4 and 10</td>
<td>20, 40, and 60</td>
</tr>
<tr>
<td>4.</td>
<td>4 and 6</td>
<td>12, 24, and 36</td>
</tr>
<tr>
<td></td>
<td>5.</td>
<td>3 and 5</td>
</tr>
<tr>
<td></td>
<td>6.</td>
<td>5 and 25</td>
</tr>
<tr>
<td></td>
<td>7.</td>
<td>7 and 10</td>
</tr>
<tr>
<td></td>
<td>8.</td>
<td>7 and 49</td>
</tr>
<tr>
<td></td>
<td>9.</td>
<td>6 and 9</td>
</tr>
<tr>
<td>10.</td>
<td>6 and 30</td>
<td>60</td>
</tr>
<tr>
<td>11.</td>
<td>5 and 6</td>
<td>30</td>
</tr>
<tr>
<td>12.</td>
<td>12 and 18</td>
<td>36</td>
</tr>
<tr>
<td>13.</td>
<td>8 and 28</td>
<td>56</td>
</tr>
<tr>
<td>14.</td>
<td>6 and 14</td>
<td>42</td>
</tr>
<tr>
<td>15.</td>
<td>5 and 14</td>
<td>70</td>
</tr>
<tr>
<td>16.</td>
<td>12 and 15</td>
<td>60</td>
</tr>
<tr>
<td>17.</td>
<td>9 and 24</td>
<td>72</td>
</tr>
<tr>
<td>18.</td>
<td>15 and 18</td>
<td>90</td>
</tr>
<tr>
<td>19.</td>
<td>12 and 4</td>
<td>84</td>
</tr>
<tr>
<td>20.</td>
<td>3, 5, and 12</td>
<td>60</td>
</tr>
<tr>
<td>21.</td>
<td>6, 16, and 24</td>
<td>48</td>
</tr>
<tr>
<td>22.</td>
<td>12, 18, and 24</td>
<td>72</td>
</tr>
<tr>
<td>23.</td>
<td>7, 10, and 14</td>
<td>70</td>
</tr>
<tr>
<td>24.</td>
<td>2, 5, and 12</td>
<td>60</td>
</tr>
</tbody>
</table>

**Find the LCM of each set of numbers.**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>7 and 10</td>
<td>70</td>
</tr>
<tr>
<td>8.</td>
<td>7 and 49</td>
<td>49</td>
</tr>
<tr>
<td>9.</td>
<td>6 and 9</td>
<td>18</td>
</tr>
<tr>
<td>10.</td>
<td>6 and 30</td>
<td>30</td>
</tr>
<tr>
<td>11.</td>
<td>5 and 6</td>
<td>30</td>
</tr>
<tr>
<td>12.</td>
<td>12 and 18</td>
<td>36</td>
</tr>
<tr>
<td>13.</td>
<td>5 and 14</td>
<td>70</td>
</tr>
<tr>
<td>14.</td>
<td>12 and 15</td>
<td>60</td>
</tr>
<tr>
<td>15.</td>
<td>9 and 24</td>
<td>72</td>
</tr>
<tr>
<td>16.</td>
<td>15 and 18</td>
<td>90</td>
</tr>
<tr>
<td>17.</td>
<td>3, 5, and 6</td>
<td>30</td>
</tr>
<tr>
<td>18.</td>
<td>6, 12, and 15</td>
<td>60</td>
</tr>
</tbody>
</table>

**9. PATTERNS** List the next four common multiples after the LCM of 3 and 8.

48, 72, 96, 120

**10. E-MAIL** Alberto gets newsletters by e-mail. He gets one for sports every 5 days, one for model railroads every 10 days, and one for music every 8 days. If he got all three today, how many more days will it be until he gets all three newsletters on the same day? 40 days
Lesson 4–5

Perfect!

A proper factor of a number is any factor of the number except the number itself. You can use proper factors to classify numbers.

A number is **abundant** if the sum of its proper factors is greater than the number itself.

Proper factors of 12: 1, 2, 3, 4, 6

\[ 1 + 2 + 3 + 4 + 6 = 16, \text{ and } 16 > 12 \text{, so 12 is abundant.} \]

Now you can probably guess the definition of a perfect number. A number is **perfect** if the sum of its proper factors is equal to the number itself.

Proper factors of 6: 1, 2, 3

\[ 1 + 2 + 3 = 6, \text{ so 6 is perfect!} \]

Tell whether each number is **abundant**, **deficient**, or **perfect**.

1. 8 2. 9
   - **deficient**  - **deficient**

3. 15 4. 18
   - **deficient**  - **abundant**

5. 20 6. 24
   - **abundant**  - **abundant**

7. 25 8. 28
   - **deficient**  - **perfect**

9. 30 10. 35
   - **abundant**  - **deficient**

11. What is the least whole number that is abundant? **12**

12. Is it possible for a prime number to be perfect? **No**; the only proper factor of a prime number is 1, so any prime number is deficient.

13. Is it possible for the sum of two deficient numbers to be an abundant number? **Yes**; Example: 10 (deficient) + 8 (deficient) = 18 (abundant)

14. CHALLENGE Show why 496 is a perfect number.
   \[
   1 + 2 + 4 + 8 + 16 + 31 + 62 + 124 + 248 = 496
   \]
Answers (Lessons 4-5 and 4-6)

Chapter 4

Lesson 4–6

NAME ________________________________________ DATE ______________ PERIOD _____

Chapter 4

39

Course 1

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You can use a spreadsheet to help you find the least common multiple of two or more numbers. Use column A to enter the numbers for which you want to find the least common multiple.

Set the formulas for columns B through L as A × 2, A × 3, A × 4, and so on.

After you have created the spreadsheet, calculate the values. Look for numbers in common in each row.

Here is an example of how to find the least common multiple of 3, 5, and 6.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
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<td>13</td>
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<td>5</td>
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<td>12</td>
<td>13</td>
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<td>2</td>
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<td>5</td>
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<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

The least common multiple of 3, 5, and 6 is 30.

Use a spreadsheet to find the least common multiple of each set of numbers.

1. 10 and 15 30
2. 6 and 27 54
3. 6 and 11 66
4. 12 and 14 84
5. 4, 12, and 16 48
6. 6, 9, and 12 36
7. Is 50 a common multiple of 5, 10, and 6? no
8. How many columns would you need in a spreadsheet to show the least common multiple of 16 and 17? Explain.
The least common multiple of 16 and 17 is 16 × 17 or 272, so the spreadsheet would have to have 17 columns.
9. Use as many columns as needed to find the least common multiple of 6, 15, and 18. 9

Get Ready for the Lesson

Complete the Mini Lab at the top of page 220 in your textbook.

Write your answers below.

1. Which fraction is greater?

\( \frac{1}{7} \) or \( \frac{2}{7} \)

2. \( \frac{1}{2} \) or \( \frac{3}{7} \)

3. \( \frac{1}{6} \) or \( \frac{2}{9} \)

4. \( \frac{3}{8} \) or \( \frac{4}{7} \)

Use a model to determine which fraction is greater.

Read the Lesson

For Exercises 4–6, look at the key concept box on page 220.

4. How is LCM related to LCD?

Sample answer: The LCD is the LCM of the denominators.

5. How can you find the least common denominator?

Sample answer: You can list the multiples of each denominator until you find a multiple that is in both lists, or you can use prime factors.

6. For the second step, it says to write an equivalent fraction for each fraction using the LCD. What are equivalent fractions?

Sample answer: Fractions that have the same value, fractions that represent the same number

7. When comparing numbers, you can use the signs <, >, and =. What does each sign mean?

Sample answer: < means “less than,” > means “greater than,” = means “equal to.”

Remember What You Learned

8. Explain how to order fractions having different denominators from least to greatest.

Sample answer: First, find the LCD of all the denominators. Next, rewrite each fraction with the LCD. Then, compare the numerators and put the fractions in order from least to greatest.
Comparing and Ordering Fractions

To compare two fractions,

- Find the least common denominator (LCD) of the fractions; that is, find the least common multiple of the denominators.
- Write an equivalent fraction for each fraction using the LCD.
- Compare the numerators.

**Example 1**
Replace each \( \ast \) with \(<\), \(>\), or \(=\) to make a true sentence.

- The LCM of 3 and 12 is 12. So, the LCD is 12.
- Rewrite each fraction with a denominator of 12.

\[
\frac{1}{3} \ast \frac{4}{12}, \quad \frac{5}{12} = \frac{5}{12}
\]
- Now, compare. Since \(\frac{1}{3} < \frac{4}{12}\), So \(\frac{1}{3} < \frac{5}{12}\).

**Example 2**
Order \(\frac{1}{6}, \frac{2}{9},\) and \(\frac{3}{8}\) from least to greatest.

The LCD of the fractions is 24. So, rewrite each fraction with a denominator of 24.

\[
\frac{1}{6} = \frac{4}{24}, \quad \frac{2}{3} = \frac{16}{24}, \quad \frac{3}{4} = \frac{18}{24}
\]
\[
\frac{1}{4} = \frac{6}{24}, \quad \frac{3}{8} = \frac{9}{24}, \quad \frac{6}{24} = \frac{6}{24}
\]

The order of the fractions from least to greatest is \(\frac{1}{6} < \frac{3}{8} < \frac{2}{9}\).

**Exercises**
Replace each \(\ast\) with \(<\), \(>\), or \(=\) to make a true sentence.

1. \(\frac{5}{12} \ast \frac{3}{8}\)
2. \(\frac{6}{8} \ast \frac{4}{9}\)
3. \(\frac{2}{7} \ast \frac{1}{6}\)

Order the fractions from least to greatest.

4. \(\frac{3}{12}, \frac{1}{4}, \frac{3}{8}, \frac{2}{7}\)
5. \(\frac{5}{12}, \frac{1}{2}, \frac{5}{8}, \frac{7}{6}\)

Order the fractions from least to greatest.

1. \(\frac{3}{8}, \frac{5}{12}, \frac{3}{4}, \frac{1}{2}\)
2. \(\frac{2}{7}, \frac{1}{3}, \frac{5}{9}, \frac{2}{3}\)
3. \(\frac{4}{5}, \frac{3}{7}, \frac{2}{9}, \frac{1}{2}\)

16. \(\frac{3}{10}, \frac{2}{9}, \frac{1}{5}, \frac{4}{7}\)
17. \(\frac{3}{8}, \frac{2}{7}, \frac{1}{4}, \frac{3}{5}\)
18. \(\frac{3}{5}, \frac{2}{9}, \frac{1}{3}, \frac{5}{9}\)
19. \(\frac{1}{2}, \frac{2}{3}, \frac{1}{4}, \frac{2}{8}\)
20. \(\frac{2}{9}, \frac{4}{7}, \frac{1}{5}, \frac{11}{12}\)
21. \(\frac{3}{8}, \frac{7}{9}, \frac{8}{10}, \frac{4}{5}\)
22. \(\frac{5}{12}, \frac{1}{2}, \frac{5}{8}, \frac{7}{6}\)

25. \(\frac{3}{8}, \frac{5}{12}, \frac{1}{2}, \frac{3}{4}\)
26. \(\frac{2}{7}, \frac{3}{14}, \frac{5}{14}, \frac{1}{2}\)
27. \(\frac{2}{3}, \frac{5}{6}, \frac{7}{12}, \frac{4}{9}\)
28. \(\frac{5}{12}, \frac{1}{5}, \frac{3}{9}, \frac{1}{5}\)
29. \(\frac{1}{2}, \frac{5}{8}, \frac{15}{16}, \frac{13}{16}\)
30. \(\frac{7}{15}, \frac{3}{12}, \frac{5}{12}, \frac{11}{12}\)

31. \(\frac{9}{12}, \frac{3}{4}, \frac{1}{5}, \frac{4}{7}\)
32. \(\frac{5}{12}, \frac{7}{10}, \frac{1}{3}, \frac{3}{5}\)
33. \(\frac{1}{2}, \frac{5}{8}, \frac{7}{16}, \frac{1}{4}\)
34. \(\frac{3}{8}, \frac{5}{12}, \frac{1}{2}, \frac{3}{4}\)
35. \(\frac{2}{7}, \frac{1}{3}, \frac{5}{9}, \frac{2}{3}\)
36. \(\frac{4}{5}, \frac{3}{7}, \frac{2}{9}, \frac{1}{2}\)
37. \(\frac{1}{2}, \frac{2}{3}, \frac{1}{4}, \frac{2}{8}\)
38. \(\frac{2}{9}, \frac{4}{7}, \frac{1}{5}, \frac{11}{12}\)
39. \(\frac{3}{8}, \frac{7}{9}, \frac{8}{10}, \frac{4}{5}\)
40. \(\frac{5}{12}, \frac{1}{2}, \frac{5}{8}, \frac{7}{6}\)

Answers (Lesson 4-6)
Lesson 4–6

Comparing and Ordering Fractions

Replace each @ with <, >, or = to make a true statement.

1. \( \frac{11}{21} \cdot \frac{2}{3} < \frac{1}{2} \cdot \frac{9}{18} = \frac{23}{8} \cdot \frac{5}{24} < \)

4. \( \frac{62}{3} \cdot \frac{6}{15} < \frac{5}{4} \cdot \frac{5}{12} > \frac{2}{3} \cdot \frac{10}{18} > \)

7. \( \frac{18}{14} \cdot \frac{1}{2} = \frac{11}{12} \cdot \frac{1}{3} < \frac{34}{18} \cdot \frac{1}{6} > \)

Order the fractions from least to greatest.

10. \( \frac{3}{5}, \frac{1}{2}, \frac{1}{3} \) of 5, 4, 2, 5

11. \( \frac{7}{9}, \frac{13}{8}, \frac{5}{3}, \frac{2}{1} = \frac{13}{7} \cdot \frac{5}{6} \cdot \frac{2}{3} \cdot \frac{1}{6} \)

12. \( \frac{62}{4}, \frac{6}{3}, \frac{6}{6}, \frac{6}{8} \) \( \frac{3}{8}, \frac{1}{2}, \frac{3}{5} \)

13. \( \frac{2}{3}, \frac{2}{5}, \frac{2}{15}, \frac{2}{9}, \frac{2}{4}, \frac{3}{3} \) \( \frac{6}{4}, \frac{4}{3}, \frac{2}{2} \)

14. MUSIC Ramundus is making a xylophone. So far, he has bars that are 1\( \frac{3}{4} \) feet, 1\( \frac{7}{12} \) feet, and 1\( \frac{2}{3} \) feet long. What is the length of the longest bar?

1\( \frac{3}{4} \) ft

15. DANCE Alana practiced dancing for 1\( \frac{1}{4} \) hours on Monday, 10\( \frac{3}{5} \) hours on Wednesday, and 2\( \frac{3}{5} \) hours on Friday. On which day did she practice the closest to 2 hours? Explain your reasoning.

Wednesday: First, write each fraction as a mixed number. Second, find the LCD, which is 40. Third, write each mixed number with a denominator of 40. Next, compare the mixed numbers. Since \( \frac{19}{8} = 2\frac{3}{8} = 2\frac{15}{40} \) is the smallest, it is closest to 2 hours.

1. SHOES Toya is looking in her closet. If \( \frac{1}{3} \) of her shoes are black and \( \frac{2}{3} \) are brown, does she have more black shoes or more brown shoes? Explain.

Brown: \( \frac{2}{5} > \frac{1}{3} \)

2. BUDGET Daniel spends 3\( \frac{2}{3} \) of his money on rent and 3\( \frac{4}{5} \) of his money on food. Does he spend more money on food or rent? Explain.

Food: \( \frac{4}{9} > \frac{3}{7} \)

3. WOODWORKING Ioi drilled a hole that is \( \frac{2}{3} \) inch wide. She has a screw that is \( \frac{5}{6} \) inch wide. Is the hole wide enough to fit the screw? Explain.

No: \( \frac{5}{6} > \frac{5}{9} \)

4. FOOD In a recent survey, \( \frac{2}{3} \) of the people surveyed said their favorite food was pizza, \( \frac{1}{4} \) said it was hot dogs, and \( \frac{3}{10} \) said it was popcorn. Which food was favored by the greatest number of people? Explain.

Pizza: \( \frac{2}{5} > \frac{3}{10} > \frac{1}{4} \)

5. OFFICE SUPPLIES A blue paper clip is \( \frac{1}{2} \) inch wide. A silver paper clip is \( \frac{1}{3} \) inch wide, and a red paper clip is \( \frac{1}{6} \) inch wide. What color paper clip has the smallest width? Explain.

Blue: \( \frac{3}{8} > \frac{1}{3} > \frac{1}{6} \)

6. GUMBALLS A red gumball is \( \frac{5}{6} \) inch across. A green gumball is \( \frac{3}{8} \) inch across, and a blue gumball is \( \frac{1}{2} \) inch across. List the gumballs in order from smallest to largest.

Red, blue, green
Developing Fraction Sense

If someone asked you to name a fraction between \(\frac{4}{7}\) and \(\frac{6}{7}\), you probably would give the answer \(\frac{5}{7}\) pretty quickly. But what if you were asked to name a fraction between \(\frac{4}{4}\) and \(\frac{5}{5}\)? At the right, you can see how to approach the problem using "fraction sense." So, one fraction between \(\frac{4}{7}\) and \(\frac{5}{7}\) is \(\frac{9}{16}\).

Use your fraction sense to solve each problem. Answers may vary.

1. Name a fraction between \(\frac{1}{7}\) and \(\frac{2}{7}\). Sample answers are given.
   \[
   \frac{1}{7} \quad \frac{2}{7} 
   \]

2. Name a fraction between \(\frac{3}{8}\) and \(\frac{4}{8}\).
   \[
   \frac{3}{8} \quad \frac{4}{8} 
   \]

3. Name five fractions between \(\frac{2}{3}\) and \(\frac{1}{3}\).
   \[
   \frac{2}{3} \quad \frac{1}{3} 
   \]

4. Name five fractions between \(0\) and \(\frac{1}{4}\).
   \[
   0 \quad \frac{1}{4} 
   \]

5. Name a fraction between \(\frac{1}{8}\) and \(\frac{2}{8}\) whose denominator is 16.
   \[
   \frac{1}{8} \quad \frac{2}{8} 
   \]

6. Name a fraction between \(\frac{3}{2}\) and \(\frac{2}{2}\) whose denominator is 10.
   \[
   \frac{3}{2} \quad \frac{2}{2} 
   \]

7. Name a fraction between \(0\) and \(\frac{1}{6}\) whose numerator is 1.
   \[
   0 \quad \frac{1}{6} 
   \]

8. Name a fraction between \(0\) and \(\frac{1}{10}\) whose numerator is not 1.
   \[
   0 \quad \frac{1}{10} 
   \]

9. Name a fraction that is halfway between \(\frac{5}{9}\) and \(\frac{7}{9}\).
   \[
   \frac{5}{9} \quad \frac{7}{9} 
   \]

10. Name a fraction between \(\frac{1}{4}\) and \(\frac{3}{4}\) that is closer to \(\frac{1}{4}\) than \(\frac{3}{4}\).
   \[
   \frac{1}{4} \quad \frac{3}{4} 
   \]

11. Name a fraction between \(0\) and \(\frac{3}{2}\) that is less than \(\frac{3}{10}\).
   \[
   0 \quad \frac{3}{10} 
   \]

12. Name a fraction between \(\frac{1}{2}\) and \(1\) that is less than \(\frac{3}{5}\).
   \[
   \frac{1}{2} \quad \frac{3}{5} 
   \]

13. Name a fraction between \(\frac{1}{2}\) and \(\frac{3}{4}\) that is greater than \(\frac{4}{5}\).
   \[
   \frac{1}{2} \quad \frac{3}{4} \quad \frac{4}{5} 
   \]

14. How many fractions are there between \(\frac{1}{4}\) and \(\frac{7}{2}\)? There are none.
   \[
   \frac{1}{4} \quad \frac{7}{2} 
   \]

Remember What You Learned

8. Work with a partner. Each of you write several decimals with varying numbers of digits. Next, exchange papers and write the decimals as fractions. Then, exchange the papers again and check one another's work. See students' work.
4-7 Study Guide and Intervention

Writing Decimals as Fractions

Decimals like 0.58, 0.12, and 0.08 can be written as fractions.

To write a decimal as a fraction, you can follow these steps.

1. Identify the place value of the last decimal place.
2. Write the decimal as a fraction using the place value as the denominator.
3. Simplify the fraction by dividing the numerator and denominator by the GCF.

Example 1
Write 0.5 as a fraction in simplest form.

0.5 = \( \frac{5}{10} \)

Simplify: Divide the numerator and denominator by the GCF, 5.

\( \frac{1}{2} \)  

So, in simplest form, 0.5 is \( \frac{1}{2} \).

Example 2
Write 0.35 as a fraction in simplest form.

0.35 = \( \frac{35}{100} \)

Simplify: Divide the numerator and denominator by the GCF, 5.

\( \frac{7}{20} \)  

So, in simplest form, 0.35 is \( \frac{7}{20} \).

Example 3
Write 4.375 as a mixed number in simplest form.

4.375 = \( \frac{4375}{1000} \)

Simplify: Divide the numerator and denominator by the GCF, 125.

\( \frac{34}{8} \)

Exercises

Write each decimal as a fraction or mixed number in simplest form.

1. 0.9 = \( \frac{9}{10} \)
2. 0.8 = \( \frac{4}{5} \)
3. 0.27 = \( \frac{27}{100} \)
4. 0.75 = \( \frac{3}{4} \)
5. 0.34 = \( \frac{17}{50} \)
6. 0.125 = \( \frac{1}{8} \)
7. 0.035 = \( \frac{7}{200} \)
8. 0.008 = \( \frac{1}{125} \)
9. 1.4 = \( \frac{7}{5} \)
10. 3.6 = \( \frac{3}{5} \)
11. 6.25 = \( \frac{25}{125} \)
12. 2.65 = \( \frac{13}{20} \)
13. 12.05 = \( \frac{250}{25} \)
14. 4.004 = \( \frac{412}{125} \)
15. 23.205 = \( \frac{23181}{250} \)
16. 51.7246 = \( \frac{517246}{250} \)
Write each decimal as a fraction in simplest form.

1. \(0.5 = \frac{1}{2}\)
2. \(0.8 = \frac{4}{5}\)
3. \(0.9 = \frac{9}{10}\)
4. \(0.75 = \frac{3}{4}\)
5. \(0.48 = \frac{12}{25}\)
6. \(0.72 = \frac{18}{25}\)
7. \(0.825 = \frac{5}{6}\)
8. \(0.065 = \frac{13}{200}\)
9. \(0.002 = \frac{1}{500}\)

Write each decimal as a mixed number in simplest form.

10. \(3.6 = 3\frac{3}{5}\)
11. \(10.4 = 10\frac{2}{5}\)
12. \(2.11 = 2\frac{11}{100}\)
13. \(29.15 = 29\frac{3}{20}\)
14. \(7.202 = 7\frac{101}{500}\)
15. \(23.335 = 23\frac{107}{200}\)

16. **DISTANCE** The library is 0.96 mile away from Theo’s home. Write this distance as a fraction in simplest form.
\[\frac{24}{25} \text{ mile}\]

17. **INSECTS** A Japanese beetle has a length between 0.3 and 0.5 inch. Find two lengths that are within the given span. Write them as fractions in simplest form.

Sample answer: \(\frac{2}{5}\) and \(\frac{9}{20}\)
Enrichment

Estimating with Decimals and Fractions

Often you only need to give a fractional estimate for a decimal. To make fractional estimates, it helps to become familiar with the decimal-fraction equivalents shown in the chart at the right. You also should be able to identify the fraction as an overestimate or underestimate. Here’s how.

The decimal 0.789 is a little less than 0.8, so it is a little less than \( \frac{8}{10} \). Write \( \frac{4}{5} \).

The decimal 1.13 is a little more than 1.125, so it is a little more than \( \frac{1125}{1000} \). Write \( \frac{11}{10} \).

Write a fractional estimate for each decimal. Be sure to identify your estimate as an overestimate or an underestimate.

Estimates may vary.

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.243</td>
<td>( \frac{1}{4} )</td>
</tr>
<tr>
<td>0.509</td>
<td>( \frac{1}{2} )</td>
</tr>
<tr>
<td>0.429</td>
<td>( \frac{2}{5} )</td>
</tr>
<tr>
<td>0.741</td>
<td>( \frac{3}{4} )</td>
</tr>
<tr>
<td>0.88</td>
<td>( \frac{7}{8} )</td>
</tr>
<tr>
<td>0.63</td>
<td>( \frac{5}{8} )</td>
</tr>
<tr>
<td>0.09</td>
<td>( \frac{1}{10} )</td>
</tr>
<tr>
<td>0.57</td>
<td>( \frac{3}{5} )</td>
</tr>
<tr>
<td>1.471</td>
<td>( \frac{11}{8} )</td>
</tr>
<tr>
<td>2.76</td>
<td>( \frac{3}{4} )</td>
</tr>
<tr>
<td>1.289</td>
<td>( \frac{13}{10} )</td>
</tr>
<tr>
<td>5.218</td>
<td>( \frac{51}{5} )</td>
</tr>
</tbody>
</table>

13. The scale in the delicatessen shows 0.73 pound. Write a fractional estimate for this weight.

14. Darnell ordered a quarter pound of cheese. The scale shows 0.23 pound. Is this more or less than be ordered? **Less**

15. On the stock market, prices are listed as halves, fourths, and eighths of a dollar. Yesterday the price of one share of a stock was $25.61. Write a fractional estimate for this amount.

16. Charlotte used a calculator to figure out how many yards of ribbon she needed for a craft project. The display shows 2.53125. Write a fractional estimate for this length.

\[ \frac{21}{2} \text{ yd} \]
Get Ready for the Lesson

Read the introduction at the top of page 229 in your textbook. Write your answers below.

1. Write the decimal for $\frac{3}{10}$. 0.3
2. Write the fraction equivalent to $\frac{1}{2}$ with a denominator of 10. $\frac{5}{10}$
3. Write the decimal for the fraction you found in Exercise 2. 0.5

Read the Lesson

4. Look at Exercise 2 at the top of page 229. What do you need to do to the fraction in order to write the decimal?
   Sample answer: Write equivalent fractions that have a denominator of 10.
5. Look at Example 1 on page 229. Why do you multiply both the numerator and denominator by 2?
   Sample answer: so the resulting numerator is 10 and can easily be written as a decimal
6. Look at Example 3 on page 230. Why do you annex zeros in method 1?
   Sample answer: since 8 is bigger than 7, you need to add zeros to be able to complete the division
7. Explain what the word annex means.
   Sample answers: to add, to insert, to include

Remember What You Learned

8. Write the following fractions as decimals. First, use the paper and pencil method. Then, use a calculator and compare your answers.
   - $\frac{3}{10}$, $\frac{1}{2}$, $\frac{1}{5}$
   - 0.25, 0.15, 0.2, 0.625
Lesson 4-8

Skills Practice

Writing Fractions as Decimals

Write each fraction or mixed number as a decimal.

1. \( \frac{9}{10} \) 0.9  
2. \( \frac{11}{100} \) 0.21  
3. \( \frac{3}{4} \) 0.75

4. \( \frac{1}{2} \) 0.5  
5. \( \frac{2}{5} \) 0.4  
6. \( \frac{7}{10} \) 0.7

7. \( \frac{5}{8} \) 0.625  
8. \( \frac{3}{8} \) 0.375  
9. \( \frac{9}{5} \) 1.8

10. \( \frac{69}{200} \) 0.345  
11. \( \frac{3}{20} \) 0.15  
12. \( \frac{65}{8} \) 8.125

13. \( \frac{21}{4} \) 5.4  
14. \( \frac{31}{16} \) 12.375  
15. \( \frac{107}{20} \) 10.85

16. \( \frac{7}{16} \) 0.4375  
17. \( \frac{311}{16} \) 3.6875  
18. \( \frac{63}{5} \) 12.6

19. \( \frac{11}{25} \) 0.44  
20. \( 10\frac{1}{8} \) 10.125  
21. \( 2\frac{1}{16} \) 2.0625

22. \( \frac{19}{20} \) 0.95  
23. \( \frac{12}{75} \) 0.16  
24. \( \frac{24}{25} \) 0.96

Replace each \( \oplus \) with <, >, or = to make a true sentence.

10. \( \frac{1}{4} \oplus 0.2 \) >  
11. \( \frac{13}{20} \oplus 0.63 \) >  
12. \( 0.5 \oplus \frac{3}{5} \) <

13. DISTANCE River Road is 11.5 miles long. Prairie Road is 14.9 miles long.

How much longer is Prairie Road than River Road? 3.4 mi

14. ANIMALS The table shows lengths of different pond insects. Using decimals, name the insect having the smallest length and the insect having the greatest length.

Smallest: Springtail; greatest: Water Treader

<table>
<thead>
<tr>
<th>Pond Insects</th>
<th>Deer Fly</th>
<th>Spongilla Fly</th>
<th>Springtail</th>
<th>Water Treader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (in.)</td>
<td>( \frac{2}{5} )</td>
<td>( \frac{3}{10} )</td>
<td>( \frac{3}{20} )</td>
<td>( \frac{1}{2} )</td>
</tr>
</tbody>
</table>

Source: Golden Nature Guide to Pond Life
### Writing Fractions as Decimals

1. **PLANETS** The planet Mercury is roughly \( \frac{4}{5} \) the size of Earth. Write the fraction as a decimal. 0.4

2. **MARLIES** Jin has a marble that is \( \frac{5}{8} \) inch wide. Write the marble's width as a decimal. 0.625 in.

3. **HOMEWORK** Miko has finished \( \frac{3}{10} \) of her homework. Write the fraction as a decimal. 0.3125

4. **EXERCISE** Tate has been dancing for \( \frac{7}{10} \) of an hour. Write this fraction as a decimal. 0.7

5. **SPORTS** Charlie played tennis for \( 3\frac{3}{4} \) hours. Write the mixed number as a decimal. 3.75

6. **COOKING** A recipe calls for \( 2\frac{3}{4} \) cups of milk. Write the mixed number as a decimal. 2.75

7. **HEIGHT** Winona is \( \frac{3}{12} \) the height of her little brother. Write the mixed number as a decimal. 2.25

8. **RECESS** Jennifer has been spinning in circles for \( 4\frac{3}{16} \) minutes. Write the mixed number as a decimal. 4.1875

### Enrichment

**Tagging Along**

Which of \( \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{8}, \) and \( \frac{9}{10} \) belongs in the “tag” on the number line at the right? The tag is to the right of 0.75, so the fraction must be greater than 0.75. Express each fraction as a decimal.

\[
\begin{align*}
\frac{2}{3} & = 0.666\ldots, \\
\frac{3}{4} & = 0.75, \\
\frac{4}{5} & = 0.8, \\
\frac{5}{8} & = 0.625, \\
\frac{9}{10} & = 0.9
\end{align*}
\]

Only 0.8 and 0.9 are greater than 0.75, and 0.9 is much closer to 1 than to 0.75. Choose 0.8, which is equal to \( \frac{4}{5} \).

On each number line, fill in the tags using the given fractions.

1. \( \frac{3}{8}, \frac{1}{2}, \frac{1}{3}, \frac{7}{8} \)

2. \( \frac{4}{3}, \frac{6}{5}, \frac{5}{15}, \frac{10}{16} \)

3. \( \frac{7}{4}, \frac{6}{5}, \frac{15}{3}, \frac{3}{4} \)

4. \( \frac{8}{5}, \frac{9}{5}, \frac{8}{3}, \frac{13}{8}, \frac{17}{13}, \frac{6}{3} \)

5. Write a fraction in simplest form for each tag on this number line. Use only the denominators 2, 3, 4, 5, 8, and 10. Express numbers greater than 1 as improper fractions.
Lesson 4–9

Lesson Reading Guide

Algebra: Ordered Pairs and Functions

Get Ready for the Lesson

Read the introduction at the top of page 233 in your textbook. Write your answers below:

1. How is the map labeled? with letters A–H and with numbers 1–6

2. Location C5 is closest to the end of which street? Yew Ct.

3. Identify where Cedar Court and Juniper Lane intersect on the map. E1

Read the Lesson

4. What is an ordered pair? Write three examples. Sample answer: An ordered pair uses the x-coordinate and y-coordinate to name a point on the coordinate plane. (3, 2), (0, 5), (6, 1)

5. What definition does a dictionary give for the word origin? Sample answer: the cause or beginning of something; the source; a beginning place

6. How does this definition of origin relate to the meaning of the word in terms of a coordinate plane? Sample answer: As in the definition, the origin on a coordinate plane is the beginning point of locating another point.

Remember What You Learned

7. Work with a partner. Have one of you plot a point on a coordinate plane, without showing your partner the point. Have your partner guess the location of the point. Without giving them the exact location, give them a hint of which direction they need to move to guess your point. Continue with a guess and a hint until your partner names the correct point. Then exchange roles and see who can name the point in the fewest number of guesses. See students' work.
A coordinate plane is formed when two number lines intersect at their zero points. This intersection is called the origin. The horizontal number line is called the x-axis. The vertical number line is called the y-axis.

An ordered pair is used to name a point on a coordinate plane. The first number in the ordered pair is the x-coordinate, and the second number is the y-coordinate.

**Example 1** Write the ordered pair that names point A.

Start at the origin. Move right along the x-axis until you are under point A. The x-coordinate is 4.

Then move up until you reach point A. The y-coordinate is 1.

So, point A is named by the ordered pair (4, 1).

**Example 2** Graph the point W(2, 4).

Start at the origin. Move 2 units to the right along the x-axis.

Then move 4 units up to locate the point. Draw a dot and label the point W.

**Exercises**

Use the coordinate plane at the right to name the ordered pair for each point.

1. J (1, 1)
2. K (4, 2)
3. L (5, 4)
4. M (2, 4)

Graph and label each point on the coordinate plane.

5. S(1, 3)
6. T(4, 0)
7. R(2, 3)
8. N(5, 4)
9. P(5, 8)
10. Q(7, 6)
11. R(0, 5)
12. S(8, 2)
13. T(1, 7)
14. F(1, 2)
Lesson 4–9

Word Problem Practice

Algebra: Ordered Pairs and Functions

PHOTOGRAPHY A photography store sells black and white film. The cost of 1, 2, and 3 rolls of black and white film are shown in the table.

<table>
<thead>
<tr>
<th>Number of Rolls</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

1. List this information as ordered pairs (number of rolls of film, cost). (1, 4), (2, 8), (3, 12)

2. Graph the ordered pairs. Then describe the graph. See students’ graphs. The points appear to fall on a line.

EXERCISE The table shows the time it takes Quentin to jog 1, 2, 3, and 4 laps around the track.

<table>
<thead>
<tr>
<th>Number of Times Around Track</th>
<th>Total Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>

3. List this information as ordered pairs (number of times around track, total time). (1, 5), (2, 10), (3, 15), and (4, 20)

4. Graph the ordered pairs. Then describe the graph. See students’ graphs. The points appear to fall on a line.

FOOTBALL In football, each field goal made scores 3 points. The table shows this relationship.

<table>
<thead>
<tr>
<th>Field Goals Made</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

5. List this information as ordered pairs (field goals made, total points). (0, 0), (1, 3), (2, 6), and (3, 9)

6. Graph the ordered pairs. Then describe the graph. See students’ graphs. The points appear to fall on a line.

JEWELRY The table gives the number of beads needed to make bracelets of lengths 7, 7.5, 8, and 8.5 inches.

<table>
<thead>
<tr>
<th>Bracelet Length (in.)</th>
<th>Number of Beads</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>7.5</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>8.5</td>
<td>34</td>
</tr>
</tbody>
</table>

7. List this information as ordered pairs (bracelet length, number of beads). (7, 28), (7.5, 30), (8, 32), and (8.5, 34)

8. Graph the ordered pairs. Then describe the graph. See students’ graphs. The points appear to fall on a line.
Investigating Coordinate Grids

You can use coordinate grids to display sets of ordered pairs. You can also find new ordered pairs by looking at the line that the plotted ordered pairs make.

The table below lists the cost of tickets to a play. The data from the table are plotted on the grid.

<table>
<thead>
<tr>
<th>Number of Tickets</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$10.00</td>
</tr>
<tr>
<td>4</td>
<td>$20.00</td>
</tr>
<tr>
<td>6</td>
<td>$30.00</td>
</tr>
<tr>
<td>8</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

The table shows the cost of 2, 4, 6, and 8 tickets. To find the cost of 5 tickets, you can use the grid to find the ordered pair that fits the table.

- Start at the origin and move to 5 on the x-axis. This is the x-coordinate.
- Move up until you meet the line. Then follow across to the left to the y-axis to find the corresponding y-coordinate. The value is 25.
- The ordered pair is (5, 25). This ordered pair means 5 tickets cost $25.

EXERCISES

Use the data plotted on the coordinate grid to answer the questions.

1. How many miles did the airplane travel in 1 hour? 120 miles
2. How many miles did the airplane travel in 2 hours? 240 miles
3. How many miles did the airplane travel in 5 hours? 600 miles
4. How long did it take the airplane to travel 720 miles? 6 hours
5. How long did it take the airplane to travel 360 miles? 3 hours
### Chapter 4 Assessment Answer Key

#### Quiz 1 (4-1 through 4-3)
Page 67

1. 21
2. 1
3. 35

4. **simplest form**
5. **

6. 
7. 
8. 
9. 7
10. B

#### Quiz 2 (Lessons 4-4 and 4-5)
Page 67

1. 24
2. 35
3. 24
4. 12
5. every 6 days

#### Quiz 3 (Lessons 4-6 and 4-7)
Page 68

1. 
2. 
3. 
4. \( \frac{1 2 7 5}{2 3 9 6} \)
5. D

6. 
7. 
8. 
9. 

#### Quiz 4 (Lessons 4-8 and 4-9)
Page 68

1. 0.875
2. 0.46
3. 4.12
4. (4, 3)
5. (0, −2)

6. 5
7. 3
8. \( \frac{45}{7} \)
9. \( \frac{5}{4} \)
10. \( \frac{25}{9} \)
11. 2
12. \( 5 \frac{1}{3} \) ft
Vocabulary Test
Page 70

1. **Venn diagram**

least common denominator (LCD)

2. **G**

3. **Venn diagram**

least common denominator (LCD)

4. **equivalent fractions**

mixed number

5. **mixed number**

common multiples

6. **common multiples**

improper fraction

7. **improper fraction**

multiple

8. __multiple__

Sample answer: the form of a fraction in which the GCF of the numerator and denominator is 1

9. __multiple__

Sample answer: the form of a fraction in which the GCF of the numerator and denominator is 1

10. __multiple__

Sample answer: the form of a fraction in which the GCF of the numerator and denominator is 1

B: Sample answer: \(\frac{31}{100}\)
Chapter 4 Assessment Answer Key

Form 2A
Page 73

1. C

2. F

3. C

4. G

5. C

6. H

7. C

8. J

9. C

10. J

B: 7 and 28

Form 2B
Page 74

1. B

2. J

3. B

4. G

5. D

6. J

7. C

8. G

9. B

10. G

(continued on the next page)
## Chapter 4 Assessment Answer Key

### Form 2B (continued)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td><strong>C</strong></td>
</tr>
<tr>
<td>12.</td>
<td><strong>J</strong></td>
</tr>
<tr>
<td>13.</td>
<td><strong>C</strong></td>
</tr>
<tr>
<td>14.</td>
<td><strong>J</strong></td>
</tr>
<tr>
<td>15.</td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>16.</td>
<td><strong>G</strong></td>
</tr>
<tr>
<td>17.</td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>18.</td>
<td><strong>G</strong></td>
</tr>
<tr>
<td>19.</td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>20.</td>
<td><strong>F</strong></td>
</tr>
</tbody>
</table>

B: **3 and 12**

### Form 2C

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>3</strong></td>
</tr>
<tr>
<td>2.</td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>3.</td>
<td><strong>6 trees</strong></td>
</tr>
<tr>
<td>4.</td>
<td><strong>36</strong></td>
</tr>
<tr>
<td>5.</td>
<td><strong>7</strong></td>
</tr>
<tr>
<td>6.</td>
<td><strong>$\frac{8}{7}$</strong></td>
</tr>
<tr>
<td>7.</td>
<td><strong>$\frac{3}{8}$</strong></td>
</tr>
<tr>
<td>8.</td>
<td><strong>$\frac{3}{4}$</strong></td>
</tr>
<tr>
<td>9.</td>
<td><strong>$\frac{31}{5}$</strong></td>
</tr>
<tr>
<td>10.</td>
<td><strong>$\frac{14}{3}$</strong></td>
</tr>
<tr>
<td>11.</td>
<td><strong>$\frac{66}{7}$</strong></td>
</tr>
<tr>
<td>12.</td>
<td><strong>$\frac{32}{9}$</strong></td>
</tr>
<tr>
<td>13.</td>
<td><strong>24</strong></td>
</tr>
<tr>
<td>14.</td>
<td><strong>48</strong></td>
</tr>
<tr>
<td>15.</td>
<td><strong>35</strong></td>
</tr>
<tr>
<td>16.</td>
<td><strong>every 24 s</strong></td>
</tr>
<tr>
<td>17.</td>
<td><strong>$&gt;$</strong></td>
</tr>
<tr>
<td>18.</td>
<td><strong>$=$</strong></td>
</tr>
<tr>
<td>19.</td>
<td><strong>$\frac{2 \cdot 5 \cdot 3 \cdot 5}{3 \cdot 7 \cdot 4 \cdot 6}$</strong></td>
</tr>
<tr>
<td>20.</td>
<td><strong>$\frac{3}{125}$</strong></td>
</tr>
<tr>
<td>21.</td>
<td><strong>$16\frac{7}{20}$</strong></td>
</tr>
<tr>
<td>22.</td>
<td><strong>0.1875</strong></td>
</tr>
<tr>
<td>23.</td>
<td><strong>2.16</strong></td>
</tr>
<tr>
<td>24 and 25.</td>
<td></td>
</tr>
</tbody>
</table>

![Diagram](image-url)

B: **$\frac{1}{5}$ in.**
Chapter 4 Assessment Answer Key

Form 2D

Page 79

1. 5

2. 1

3. 8 seedlings

4. 24

5. 8

6. \( \frac{3}{4} \)

7. simplest form

8. \( \frac{2}{3} \)

9. \( \frac{21}{5} \)

10. \( \frac{20}{3} \)

11. \( \frac{4}{7} \)

12. \( \frac{2}{9} \)

13. 6

Page 80

14. 36

15. 21

16. every 48 seconds

17. <

18. =

19. \( \frac{2}{3}, \frac{7}{10}, \frac{7}{9}, \frac{5}{6} \)

20. \( \frac{7}{125} \)

21. \( \frac{12.9}{20} \)

22. 0.3125

23. 1.68

24 and 25.

B: \( \frac{1}{5} \) in.
Chapter 4 Assessment Answer Key

Form 3
Page 81

1. ______ 6 ______
2. ______ 12 ______
3. ______ 1 ______
4. ______ 24 ______
5. ______ 7 appetizers ______

6. ______ 6 ______
7. ______ 15 ______
8. ______ 192 ______
9. ______ 6 ______
10. ______ 7 ______
11. simplest form
12. ______ 3 ______
13. ______ 5 ______
14. ______ 45 ______
15. ______ 7 ______
16. ______ 3 ______
17. ______ 7 ______
18. ______ 6 ______
19. ______ 1 ______
20. ______ 23 ______
21. ______ 3 ______
22. ______ 8 ______
23. ______ 13 ______
24. ______ 3 ______
25. ______ 5 ______
26. ______ 11 ______
27. ______ 40 ______
28. ______ 16 ______
29. ______ 1 ______
30. ______ 200 ______
31. ______ 0.416 ______
32. ______ 0.83 ______
33. ______ 8.1875 ______
34. ______ 150 min ______

32 and 33.

Sample answer:

B: ______ 8, 12 ______
## Chapter 4 Assessment Answer Key
### Page 83, Extended-Response Test
#### Scoring Rubric

<table>
<thead>
<tr>
<th>Level</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student demonstrates a <strong>thorough understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.</td>
</tr>
<tr>
<td>3</td>
<td>The student demonstrates an <strong>understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student's response to the task is essentially correct with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding. The response may contain minor errors that reflect inattentive execution of the mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.</td>
</tr>
<tr>
<td>2</td>
<td>The student has demonstrated only a <strong>partial understanding</strong> of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student's work lacks an essential understanding of the underlying mathematical concepts. The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.</td>
</tr>
<tr>
<td>1</td>
<td>The student has demonstrated a <strong>very limited understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student's response to the task is incomplete and exhibits many flaws. Although the student has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete. The response exhibits many errors or may be incomplete.</td>
</tr>
<tr>
<td>0</td>
<td>The student has provided a <strong>completely incorrect</strong> solution or uninterpretable response, or no response at all.</td>
</tr>
</tbody>
</table>
In addition to the scoring rubric found on page A36, the following sample answers may be used as guidance in evaluating open-ended assessment items.

1. a. Nov.: \( \frac{9}{24} = \frac{3}{8} \); Dec.: \( \frac{2}{10} = \frac{1}{5} \); Jan.: \( \frac{3}{20} = \frac{3}{10} \); Feb.: \( \frac{12}{16} = \frac{3}{4} \)

b. First, find the LCD of all the denominators, which is 40 for these fractions in simplified form. Then compare the numerators and put the fractions in order according to the numerators.

2. a. November’s rainfall is \( \frac{4\frac{1}{3}}{5} \) in. or \( \frac{13}{3} \) in. December’s rainfall is \( \frac{3\frac{2}{5}}{2} \) in. or \( \frac{17}{5} \) in. The denominator of the improper fraction is the denominator of the fraction in the mixed number. You can find the numerator of the improper fraction by multiplying the whole number by the denominator and adding the numerator.

b. January’s rainfall is \( \frac{14}{5} \) in. or \( \frac{2\frac{4}{5}}{5} \) in.

February’s rainfall is \( \frac{15}{2} \) or \( 7\frac{1}{2} \) in.

The answer can be found for each mixed number by dividing the numerator of the fraction by the denominator and then using the remainder as the numerator of the fraction part of the mixed number.

3. a. November: \( \frac{6}{10} \) in.

\( \frac{6}{10} = \frac{3}{5} \) in.

December: \( \frac{32}{100} \) in.

\( \frac{32}{100} = \frac{8}{25} \) in.

4. factors of 16: 1, 2, 4, 8, 16

factors of 32: 1, 2, 4, 8, 16, 32

factors of 48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48

The GCF is 16. So, the greatest number of seedlings that can be placed in a row is 16.
Chapter 4 Assessment Answer Key

Standardized Test Practice

Page 84

1. ○ ○ ○ ○

10. ○ ○ ● ○

11. ● ○ ○ ○

2. ● ○ ○ ○

12. ○ ○ ○ ○

3. ○ ○ ○ ●

13. ○ ○ ○ ○

4. ○ ○ ○ ○

5. ○ ○ ○ ●

14. 59

6. ● ○ ○ ○

15. 15.75

7. ○ ○ ● ○

8. ○ ○ ● ○

9. ● ○ ○ ○

(continued on the next page)
Chapter 4 Assessment Answer Key

Standardized Test Practice (continued)
Page 86

16. 34, 28, 22

twelve and eight hundred sixty-three thousandths

17. 6

18. 3.75 ft

19. 48

20. 0.13 in.

22.

23a. \(1 \frac{3}{8}\)

23b. 1.375

23c. \(2 \frac{13}{20}\) lb