

Chapter 2 Vocabulary Check

Fill in each blank with one of the words or phrases listed below.

mixed number equivalent 0 undefined
 composite number improper fraction simplest form prime factorization
 prime number proper fraction numerator denominator
 reciprocals cross products

- Two numbers are _____ of each other if their product is 1.
- A(n) _____ is a natural number greater than 1 that is not prime.
- Fractions that represent the same portion of a whole are called _____ fractions.
- A(n) _____ is a fraction whose numerator is greater than or equal to its denominator.
- A(n) _____ is a natural number greater than 1 whose only factors are 1 and itself.
- A fraction is in _____ when the numerator and the denominator have no factors in common other than 1.
- A(n) _____ is one whose numerator is less than its denominator.
- A(n) _____ contains a whole number part and a fraction part.
- In the fraction $\frac{7}{9}$, the 7 is called the _____ and the 9 is called the _____.
- The _____ of a number is the factorization in which all the factors are prime numbers.
- The fraction $\frac{3}{0}$ is _____.
- The fraction $\frac{0}{5} =$ _____.
- In $\frac{a}{b} = \frac{c}{d}$, $a \cdot d$ and $b \cdot c$ are called _____.

Helpful Hint

Are you preparing for your test? Don't forget to take the Chapter 2 Test on page 168. Then check your answers at the back of the text and use the Chapter Test Prep Videos to see the fully worked-out solutions to any of the exercises you want to review.

2 Chapter Highlights

Definitions and Concepts

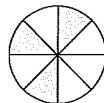
Examples

Section 2.1 Introduction to Fractions and Mixed Numbers

A fraction is of the form.

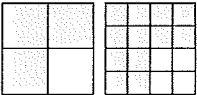
$\frac{\text{numerator}}{\text{denominator}}$ ← number of parts being considered
 ← number of equal parts in the whole

Write a fraction to represent the shaded part of the figure.



$\frac{3}{8}$ ← number of parts shaded
 ← number of equal parts

(continued)

Definitions and Concepts	Examples
Section 2.1 Introduction to Fractions and Mixed Numbers (continued)	
<p>A fraction is called a proper fraction if its numerator is less than its denominator.</p> <p>A fraction is called an improper fraction if its numerator is greater than or equal to its denominator.</p> <p>A mixed number contains a whole number and a fraction.</p> <p>To WRITE A MIXED NUMBER AS AN IMPROPER FRACTION</p> <ol style="list-style-type: none"> Multiply the denominator of the fraction by the whole number. Add the numerator of the fraction to the product from step 1. Write this sum from step 2 as the numerator of the improper fraction over the original denominator. <p>To WRITE AN IMPROPER FRACTION AS A MIXED NUMBER OR A WHOLE NUMBER</p> <ol style="list-style-type: none"> Divide the denominator into the numerator. The whole number part of the mixed number is the quotient. The fraction is the remainder over the original denominator. <p style="text-align: center;">quotient $\frac{\text{remainder}}{\text{original denominator}}$</p>	$\frac{1}{3}, \frac{2}{5}, \frac{7}{8}, \frac{100}{101}$ $\frac{5}{4}, \frac{2}{2}, \frac{9}{7}, \frac{101}{100}$ $1\frac{1}{2}, 5\frac{7}{8}, 25\frac{9}{10}$ $5\frac{2}{7} = \frac{7 \cdot 5 + 2}{7} = \frac{35 + 2}{7} = \frac{37}{7}$ $\frac{17}{3} = 5\frac{2}{3}$ $\begin{array}{r} 5 \\ 3 \overline{)17} \\ \underline{15} \\ 2 \end{array}$
Section 2.2 Factors and Prime Factorization	
<p>A prime number is a natural number that has exactly two different factors, 1 and itself.</p> <p>A composite number is any natural number other than 1 that is not prime.</p> <p>The prime factorization of a number is the factorization in which all the factors are prime numbers.</p>	<p>2, 3, 5, 7, 11, 13, 17, ...</p> <p>4, 6, 8, 9, 10, 12, 14, 15, 16, ...</p> <p>Write the prime factorization of 60.</p> $60 = 6 \cdot 10$ $= 2 \cdot 3 \cdot 2 \cdot 5 \quad \text{or} \quad 2^2 \cdot 3 \cdot 5$
Section 2.3 Simplest Form of a Fraction	
<p>Fractions that represent the same portion of a whole are called equivalent fractions.</p> <p>A fraction is in simplest form or lowest terms when the numerator and the denominator have no common factors other than 1.</p>	 $\frac{3}{4} = \frac{12}{16}$ <p>The fraction $\frac{2}{3}$ is in simplest form.</p>

Definitions and Concepts	Examples
Section 2.3 Simplest Form of a Fraction (continued)	
<p>To write a fraction in simplest form, write the prime factorizations of the numerator and the denominator and then divide both by all common factors.</p> <p>Two fractions are equivalent if</p> <p>Method 1. They simplify to the same fraction.</p> <p>Method 2. Their cross products are equal.</p>	<p>Write in simplest form: $\frac{30}{36}$</p> $\frac{30}{36} = \frac{2 \cdot 3 \cdot 5}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{2 \cdot \cancel{3} \cdot 5}{2 \cdot \cancel{3} \cdot 2 \cdot 3} = 1 \cdot 1 \cdot \frac{5}{6} = \frac{5}{6}$ <p>or $\frac{30}{36} = \frac{\overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{3}} \cdot 5}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{3}} \cdot 2 \cdot 3} = \frac{5}{6}$</p> <p>Determine whether $\frac{7}{8}$ and $\frac{21}{24}$ are equivalent.</p> <p>Method 1. $\frac{7}{8}$ is in simplest form; $\frac{21}{24} = \frac{\overset{1}{\cancel{3}} \cdot 7}{\overset{1}{\cancel{3}} \cdot 8} = \frac{7}{8}$</p> <p>Since both simplify to $\frac{7}{8}$, then $\frac{7}{8} = \frac{21}{24}$.</p> <p>Method 2.</p> $\begin{array}{rcl} 24 \cdot 7 & & 8 \cdot 21 \\ = 168 & \frac{7}{8} = \frac{21}{24} & = 168 \end{array}$ <p>Since $168 = 168$, $\frac{7}{8} = \frac{21}{24}$</p>
Section 2.4 Multiplying Fractions and Mixed Numbers	
<p>To multiply two fractions, multiply the numerators and multiply the denominators.</p> <p>To multiply with mixed numbers or whole numbers, first write any mixed or whole numbers as fractions and then multiply as usual.</p>	<p>Multiply.</p> $\frac{7}{8} \cdot \frac{3}{5} = \frac{7 \cdot 3}{8 \cdot 5} = \frac{21}{40}$ $\frac{3}{4} \cdot \frac{1}{6} = \frac{3 \cdot 1}{4 \cdot 6} = \frac{\overset{1}{\cancel{3}} \cdot 1}{4 \cdot \overset{1}{\cancel{3}} \cdot 2} = \frac{1}{8}$ $2\frac{1}{3} \cdot \frac{1}{9} = \frac{7}{3} \cdot \frac{1}{9} = \frac{7 \cdot 1}{3 \cdot 9} = \frac{7}{27}$
Section 2.5 Dividing Fractions and Mixed Numbers	
<p>To find the reciprocal of a fraction, interchange its numerator and denominator.</p> <p>To divide two fractions, multiply the first fraction by the reciprocal of the second fraction.</p> <p>To divide with mixed numbers or whole numbers, first write any mixed or whole numbers as fractions and then divide as usual.</p>	<p>The reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$.</p> <p>Divide.</p> $\frac{3}{10} \div \frac{7}{9} = \frac{3}{10} \cdot \frac{9}{7} = \frac{3 \cdot 9}{10 \cdot 7} = \frac{27}{70}$ $2\frac{5}{8} \div 3\frac{7}{16} = \frac{21}{8} \div \frac{55}{16} = \frac{21}{8} \cdot \frac{16}{55} = \frac{21 \cdot 16}{8 \cdot 55}$ $= \frac{21 \cdot \overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{8}}}{\underset{1}{\cancel{8}} \cdot 55} = \frac{42}{55}$