#### Lesson 2

### Foundations of College Algebra

# Simplest Form of a Fraction

Definition

- Equivalent fractions are fractions that have the same value.
- A fraction is considered simplified if there are not common factors in the numerator and denominator.

How To - Simplify a Fraction

- 1. Rewrite the numerator and denominator to show he common factors. If needed, factor the numerator and denominator into prime factors.
- 2. Simplify, using the equivalent fractions property, by removing common factors.
- 3. Multiply any remaining factors.

Examples

1.  $\frac{10}{15}$ 

2.  $\frac{12}{16}$ 

3.  $\frac{210}{385}$ 

You Try

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

2.  $\frac{40}{88}$ 

3.  $\frac{120}{252}$ 

# Multiplying Fractions

How To - Fraction Multiplication

If a, b, c, and d are numbers where  $b \neq 0$  and  $d \neq 0$ , then

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}.$$

Hint It is easier to cancel factors before multiplying numerators and denominators.

Examples

Multiply and write the answer in simplest form.

1. 
$$\frac{5}{9} \cdot \frac{3}{10}$$

2. 
$$\frac{63}{84} \cdot \frac{44}{90}$$

3. 
$$\frac{27}{32} \cdot \frac{10}{13} \cdot \frac{16}{30}$$

You Try

Multiply and write the answer in simplest form.

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

2. 
$$\frac{3}{8} \cdot \frac{4}{15}$$

3. 
$$\frac{33}{60} \cdot \frac{40}{88}$$

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### Multiplying Fractions and Mixed Numbers

How To - Multiply or Divide Mixed Numbers

- 1. Convert the mixed numbers to improper fractions.
- 2. Follow the rules for fraction multiplication or division.
- 3. Simplify if possible.

Examples

Multiply and write your answer in simplest form.

1. 
$$3\frac{1}{3} \cdot \frac{5}{8}$$

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

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

You Try

Multiply and write your answer in simplest form.

1. 
$$4\frac{3}{8} \cdot \frac{7}{10}$$

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

3. 
$$4\frac{4}{9} \cdot 5\frac{13}{16}$$

# Solving Problems by Multiplying Fractions

You Try

A booth at the county fair sells fudge by the pound. Their award winning "Chocolate Overdose" fudge contains  $2\frac{2}{3}$  cups of chocolate per pound.

- 1. How many cups of chocolate chips are in a half-pound of fudge?
- 2. The owners of the booth need to make the fudge in 10-pound batches. How many chocolate chips do they need to make a 10-pound batch? Write your results as an improper fraction and as a mixed number.

#### Finding Reciprocals of Fractions

Definition

The **reciprocal** of the fraction  $\frac{a}{b}$  is  $\frac{b}{a}$ , where  $a \neq 0$  and  $b \neq 0$ . A number and its reciprocal have a product of 1.

Examples

Find the reciprocal of each number.

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

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

### **Dividing Fractions**

How To - Divide Fractions

To divide two fractions, multiply the first fraction by the reciprocal of the second. If a, b, c, and d are numbers where  $b \neq 0$ ,  $c \neq 0$ , and  $d \neq 0$ , then

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}.$$

Hint You should flip the second fraction before doing any other steps.

Examples

Divide and write the answer in simplified form.

1. 
$$\frac{2}{5} \div \frac{3}{7}$$

2. 
$$\frac{7}{18} \div \frac{14}{27}$$

You Try

Divide and write the answer in simplified form.

1. 
$$\frac{7}{27} \div \frac{35}{36}$$

2. 
$$\frac{5}{14} \div \frac{15}{28}$$

# **Dividing Fractions and Mixed Numbers**

Examples

Divide and write your answer in simplified form.

1. 
$$3\frac{4}{7} \div 5$$

2. 
$$18\frac{3}{4} \div 3\frac{3}{4}$$

You Try

Divide and write your answer in simplified form.

1. 
$$5\frac{1}{3} \div 4$$

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

## Solving Problems by Dividing Fractions

You Try

Traxel's Jewelry paid \$150 for a  $\frac{3}{8}$ -carat gem. At this price, what is the cost of one carat.

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