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

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. $\frac{1}{11}$
3. 13

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.