

# Complex Fractions and Unit Rates

## Lesson 2

# Objective

Students will be able to compute unit rates associated with ratio of fractions. They will also be able to solve real world math problems using the operation with rational numbers.

# Simplify a Complex Fraction

Fractions like  $\frac{\frac{20}{1}}{\frac{1}{2}}$  are called complex fractions.

**Complex fractions** are fractions with a numerator, denominator, or both that are also fractions. Complex fractions are simplified when both the numerator and denominator are integers.

# Examples

1. Remember a fraction can be written as a division problem.

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

Write the complex fraction as a division problem

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

Multiply by the reciprocal of 2, which is  $\frac{1}{2}$

$$= \frac{1}{8}$$

Simplify.

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

# You try.

$$\text{a. } \frac{\frac{2}{2}}{3}$$

$$\text{b. } \frac{\frac{6}{1}}{3}$$

$$\text{c. } \frac{\frac{2}{3}}{7}$$

$$\text{d. } \frac{\frac{2}{4}}{2}$$

# Find Unit Rates

When the fractions of a complex fractions represent different units, you can find the unit rate.

# Examples

3. Josiah can jog  $1\frac{1}{3}$  miles in  $\frac{1}{4}$  hour. Find his average speed in miles per hour.

4. Tia is painting her house. She paints  $34\frac{1}{2}$  square feet in  $\frac{3}{4}$  hour. At this rate, how many square feet can she paint each hour?

e. Mr. Allen is spreading mulch in his yard. He spreads  $4\frac{2}{3}$  square yards in 2 hours. How many square yards can he mulch per hour?

Answer:  $2\frac{1}{3}$  square yards per hour.

f. Aubrey can walk  $4\frac{1}{2}$  miles in  $1\frac{1}{2}$  hours. Find her average speed in miles per hour.  $3$  miles per hour.

# Change Percent to a Fraction

To change a percent to a fraction, rewrite the percent as a complex fraction with 100 as the denominator.

# Example

A country's sales tax is  $6\frac{2}{3}\%$ . Write the percent as a fraction in simplest form.

$$\frac{6\frac{2}{3}}{100} =$$

# Real World Example

On Javier's soccer team, about  $33\frac{1}{3}\%$  of the players have scored a goal. Write  $33\frac{1}{3}\%$  as a fraction in simplest form.

$$\begin{aligned}33\frac{1}{3}\% &= 33\frac{1}{3} \div 100 \\ &= \frac{100}{3} \div \frac{100}{1} \\ &= \frac{100}{3} \times \frac{1}{100} = \frac{1}{3}\end{aligned}$$