

Student to Student

Simplifying Complex Fractions



Brian Carr
Riverside High School

When I simplify complex fractions, I draw arrows connecting the outermost and innermost numbers.

Then I make a new fraction by writing the product of the outermost numbers as the numerator and the product of the innermost numbers as the denominator.

$$\frac{\frac{3}{5}}{\frac{1}{2}} = \frac{6}{5} = 1\frac{1}{5}$$

It also works for rational expressions.

$$\frac{\frac{x^2}{x+1}}{\frac{x}{2}} = \frac{2x^2}{x(x+1)} = \frac{2x}{x+1}$$

COMMON
CORE GPS

EXAMPLE
MCC.MP.2

6 Transportation Application

my.hrw.com



Online Video Tutor

A freight train averages 30 mi/h traveling to its destination with full cars and 40 mi/h on the return trip with empty cars. What is the train's average speed for the entire trip? Round to the nearest tenth.

Total distance: $2d$

Total time: $\frac{d}{30} + \frac{d}{40}$

Average speed: $\frac{2d}{\frac{d}{30} + \frac{d}{40}}$

$$\frac{2d(120)}{\frac{d}{30}(120) + \frac{d}{40}(120)}$$

$$\frac{240d}{4d + 3d}$$

$$\frac{240\cancel{d}}{7\cancel{d}} \approx 34.3$$

The train's average speed is 34.3 mi/h.

Let d represent the one-way distance.

Use the formula $t = \frac{d}{r}$.

The average speed is $\frac{\text{total distance}}{\text{total time}}$.

The LCD of the fractions in the denominator is 120.

Simplify.

Combine like terms and divide out common factors.



6. Justin's average speed on his way to school is 40 mi/h, and his average speed on the way home is 45 mi/h. What is Justin's average speed for the entire trip? Round to the nearest tenth.

MCC.MP.1

MATHEMATICAL
PRACTICES

THINK AND DISCUSS

1. Explain how to find the LCD of two rational expressions.

2. **GET ORGANIZED** Copy and complete the graphic organizer. In each box, write an example and show how to simplify it.



Rational Expressions

Adding (like denominators)

Subtracting (unlike denominators)

Simplifying a complex fraction