

When you are done with your 7.6 homework you should be able to...

- π Simplify a complex rational expression by simplifying the numerator and denominator separately (method I)
- π Simplify a complex rational expression using the least common denominator (method II)

WARM-UP:

1. Perform the indicated operation and simplify.

a. $\frac{5x-1}{x^2} \div \frac{25x^2-1}{5x}$

b. $\frac{x-1}{x^2-36} - \frac{x}{x^2-12x+36}$

Definition

A **complex rational expression** is a fraction in which the numerator and/or the denominator contains the sum or difference of two or more rational expressions.

Steps to simplify a complex Rational Expression by simplifying the numerator and denominator separately (method I)

Step 1: Write the numerator of the complex rational expression as a single rational expression.

Step 2: Write the denominator of the complex rational expression as a single rational expression.

Step 3: Rewrite the complex rational expression using the rational expressions determined in steps 1 and 2.

Step 4: Simplify the rational expression using the techniques used for dividing rational expressions from section 7.2.

2. Simplify.

$$\text{a. } \frac{\frac{b}{b+1} - 1}{\frac{b+3}{b} - 2}$$

$$\text{b. } \frac{\frac{-6}{y^2+5y+6}}{\frac{2}{y+3} - \frac{3}{y+2}}$$

$$\text{c. } \frac{4 + \frac{1}{x}}{8 + \frac{2}{x}}$$

$$\text{d. } \frac{\frac{x}{x+y} - 1}{\frac{y}{x+y} - 1}$$

Steps to simplify a complex rational expression by using the least common denominator (LCD) (method II)

Step 1: Find the least common denominator among all the denominators in the complex rational expression.

Step 2: Multiply both the numerator and the denominator of the complex rational expression by the least common denominator (LCD) found in step 1.

Step 3: Simplify the complex rational expression.

3. Simplify.

a. $\frac{\frac{1}{x} - \frac{1}{y}}{2xy}$

b. $\frac{\frac{x}{x+1}}{1 + \frac{1}{x-1}}$

c. $\frac{2 - \frac{3}{x} - \frac{2}{x^2}}{1 - \frac{5}{x} + \frac{6}{x^2}}$