

Algebra 2

8.2

Determine the LCM of polynomials

Add and subtract rational expressions

LCM

denominator

numerator

complex fraction

whiteboards

Here's where it is going...

Numbers

$$\frac{5}{6} + \frac{4}{9}$$

Polynomials

$$\frac{3}{x^2 - 3x + 2} + \frac{5}{2x^2 - 2}$$

~~$\begin{matrix} 2 \\ -2 & -1 \\ -3 \end{matrix}$~~ $(x-2)(x-1)$ $2(x^2-1)$
 $2(x+1)(x-1)$

1. What denominator will work? (LCM)
2. What do I need? (FFOO)
3. Combine terms (EWE, whatever)
4. Simplify

$2(x-2)(x-1)(x+1)$
LCM

$$\frac{3}{3} \frac{(x-8)}{4x^2+21x+5} + \frac{6}{12x+3} \frac{(x+5)}{(x+5)}$$

$$\frac{20}{3} \frac{(4x+1)(20x+5)}{(x+5)(4x+1)}$$

$$3(x+5)(4x+1)$$

$$\frac{3(x-8)}{3(x+5)(4x+1)} + \frac{6(x+5)}{3(x+5)(4x+1)}$$

$$3x-24+6x+30$$

$$\frac{9x+6}{3(x+5)(4x+1)}$$

$$\frac{3x+2}{(x+5)(4x+1)} = \frac{3(3x+2)}{3(x+5)(4x+1)}$$

Guided Practice

Simplify each expression.

3A. $\frac{x-1}{x^2-x-6} + \frac{-4}{5x+10}$

Subtraction: be careful

$$\text{LCM} = 5(x+2)(x-3)$$

$$\frac{5x-5-4x+12}{5(x+2)(x-3)}$$
$$\frac{x+7}{5(x+2)(x-3)}$$

$$\frac{5(x-1)}{5(x+2)(x-3)} + \frac{-4(x-3)}{5(x+2)(x-3)}$$
~~$$\frac{5x-5+4x-12}{5(x+2)(x-3)} = \frac{9x-17}{5(x+2)(x-3)}$$~~

Example 4 Complex Fractions with Different LCDs

Simplify $\left(\frac{1 + \frac{1}{x}}{1 - \frac{x}{y}} \right)$

$$\frac{\overset{x}{x} \frac{1}{1} + \frac{1}{x}}{\underset{y}{y} \frac{1}{1} - \frac{x}{y}} = \frac{\left(\frac{x+1}{x} \right) \cdot \frac{y}{y-x}}{\left(\frac{y-x}{y} \right)}$$

$$\frac{y(x+1)}{x(y-x)}$$

Isn't this code for division?
 Reminder: the fraction bar is a grouping symbol

- simplify numerator and denom. first
- mult by recip

Guided Practice

Simplify each expression.

$$4A \frac{\frac{x}{1} \cdot \frac{1 - \frac{y}{x}}{1}}{\frac{1}{y} + \frac{1}{x}} \cdot \frac{yx}{x+y} = \frac{\cancel{xy}(x-y)}{\cancel{y}(x+y)}$$
$$\frac{y(x-y)}{(x+y)}$$

4B. $\frac{\frac{c}{d} - \frac{d}{c}}{\frac{d}{c} + 2}$

$$\frac{\frac{a}{b} + 1}{1 - \frac{b}{a}}$$