

Algebra 2 8.2

Determine the LCM of polynomials

Add and subtract rational expressions

LCM *each included*
denominator } *common denom = LCM*
numerator } *same*
complex fraction
whiteboards
FFOO

Here's where it is going...

Numbers $\frac{6}{6} \frac{5}{6} + \frac{4}{9} \frac{4}{4} = \frac{30+16}{36}$

$-1 \frac{46}{36} = \frac{23}{18}$

Polynomials

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

$(x-1)(x-2)$ $2(x^2-1)$

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

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

- * What denominator will work? (LCM)
- * What do I need? (FFOO)
- * Combine terms (EWE, whatever)
- * Simplify

$$\frac{4}{x+1} + \frac{6}{x+3}$$

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

$$\frac{10x+18}{(x+1)(x+3)}$$

$$\frac{3 \cdot 2(x+1) + 5(x-2)}{2(x-1)(x-2)(x+1)}$$

$$\frac{6x+6+5x-10}{2(x-1)(x-2)(x+1)}$$

$$\frac{11x-4}{2(x-1)(x-2)(x+1)}$$

$\overline{m-9}$ $\overline{a-m}$
 $-1(-9+m)$

$$\frac{5a^3 \cdot 3a^2}{5a^3 \cdot 16b^2} - \frac{8x \cdot 16b}{5a^3 b \cdot 16b} = \frac{15a^5 - 16xb}{80a^3b^2}$$

$$\frac{5a+30}{5} = \frac{12}{5}$$

$$a+6$$

$$\frac{x+3}{x+2} \cdot \frac{2}{x+1} - \frac{3}{x+3} \cdot \frac{(x+1)}{(x+1)}$$

$$\frac{2x+6-3x-3}{(x+1)(x+3)} = \frac{-x+3}{(x+1)(x+3)}$$

$$3B. \frac{x-8}{4x^2+21x+5} + \frac{6}{12x+3} \frac{(x+5)}{(x+5)} = \frac{3x-24+6x+30}{3(4x+1)(x+5)}$$

$$\begin{array}{r} 20 \\ \hline 120 \\ 210 \\ \hline 45 \end{array} (4x+1)(x+5)$$

$$-1pt$$

$$= \frac{9x+6}{3(4x+1)(x+5)} = \frac{\cancel{3}(\cancel{3x+2})}{\cancel{3}(4x+1)\cancel{(x+5)}} = \frac{3x+2}{(4x+1)(x+5)}$$

GuidedPractice

Simplify each expression.

Subtraction: be careful

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

Example Complex Fractions with Different LCDs

Simplify $\frac{\frac{1}{y} + \frac{1}{x}}{\frac{1}{y} - \frac{x}{y}}$ $\rightarrow \frac{\frac{x+1}{x}}{\frac{y-x}{y}}$

(Handwritten red annotations: a large red arrow points from the complex fraction to the simplified form, and the word "division" is written vertically in red next to the arrow.)

Isn't this code for division?
 Reminder: the fraction bar is a grouping symbol
 ·simplify numerator and denom. first
 ·mult by recip

$$\frac{x+1}{x} \div \frac{y-x}{y}$$

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

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

Guided Practice

Simplify each expression.

4A. $\frac{\left(x - \frac{y}{x}\right)}{\frac{1}{y} + \frac{1}{x}}$

$$\frac{\frac{x-y}{x}}{\frac{x+y}{xy}}$$

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

$$\frac{y(x-y)}{x+y} = \frac{yx-y^2}{x+y}$$

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

$$\frac{a-n}{-1(-a+n)}$$

$$n-a$$

$$x^2 + 5x$$

$$x^2 + 5x = 0$$

WB 8.2 pr.
oals