

Algebra 2 8.2

Determine the LCM of polynomials

Add and subtract rational expressions

LCM **smallest product w. all listed factors**

denominator

numerator

complex fraction

whiteboards

3, 8, 24

$$\frac{(n)}{(d)} \quad \frac{1}{2} \quad \frac{2}{\frac{1}{4}} \quad \frac{\frac{1}{3}}{\frac{2}{5}}$$

(Note: The number 24 in the original image is circled.)

Numbers

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

$$\frac{15}{18} + \frac{8}{18}$$

$$\frac{23}{18}$$

Polynomials

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

Here's where it is going...

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

2B. $\frac{3a^2}{16b^2} - \frac{8x}{5a^3b} = \frac{15a^5}{80b^2a^3} + -\frac{128xb}{80b^2a^3}$

*
$$\frac{15a^5 - 128bx}{80a^3b^2}$$

$$\frac{3x-24}{3(4x+1)(x+5)} + \frac{6x+30}{3(4x+1)(x+5)}$$

The first fraction has a green '3' above the numerator and a green circle around the denominator $(4x+1)(x+5)$.
 The second fraction has a pink 'x+5' above the numerator and a pink circle around the denominator $3(4x+1)$.
 The common denominator is $3(4x+1)(x+5)$.

$$\frac{20}{120} (4x^2 + 20x + 1)(x+5)$$

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

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

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

Guided Practice

Simplify each expression.

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

(Handwritten annotations: The denominator x^2-4 is circled in green and factored into $(x-3)(x+2)$. The second fraction's denominator $(5x+10)(x-3)$ is circled in pink and simplified to $5(x+2)(x-3)$. Checkmarks are present under the factored terms.)

Subtraction: be careful

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

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

$$\begin{array}{l}
 S_a \quad \frac{3a^2bx}{12ab^3} + \frac{-2nx}{12b^3 \cdot 5a^2} = \frac{15a^3bx}{60a^2b^3} + \frac{-24b^3nx}{60a^2b^3} \\
 S_a \quad \frac{3a^2bx}{12ab^3} + \frac{-2nx}{12b^3 \cdot 5a^2} = \frac{15a^3bx - 24b^3nx}{60a^2b^3}
 \end{array}$$

Example 4 Complex Fractions with Different LCDs

Simplify $\frac{\frac{1}{3}\left(1 + \frac{1}{x}\right)}{\frac{1}{5}\left(1 - \frac{x}{y}\right)}$ = $\frac{\left(\frac{x+1}{x}\right)}{\left(\frac{y-x}{y}\right)}$ $\frac{y}{y-x}$

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

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

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

$\frac{\cancel{x} y}{x+y}$

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

$2 \cdot 7 \cdot 3 \cdot 3$
 $a^2 b^2 c^5$

$\frac{14}{2 \cdot 7}$

$\frac{42}{2 \cdot 3 \cdot 7}$

$\frac{18}{2 \cdot 3 \cdot 3}$

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