Adding and Subtraction RATIONAL Expressions (fractions)

1. Common Denominator	1. $\dfrac{1}{4} + \dfrac{5}{4} = \dfrac{6}{4}$	2. $\dfrac{7}{2x^2} - \dfrac{3.}{2x^2} + \dfrac{2.}{2x^2}$
2. If subtraction, distribute the negative to all terms in the numerator that follows the "-".	$= \boxed{\dfrac{3}{2}}$	$= \dfrac{6}{2x^2}$
3. Add NUMERATOR		$= \boxed{\dfrac{3}{x^2}}$
4. DENOMINATOR stays the same!!!!!	3. $\dfrac{4x+11}{x+3} + \dfrac{x+4}{x+3}$	4. $\dfrac{4x-1}{x^2-4} - \dfrac{(3x-3)}{(x^2-4)}$ distribute the "—"
5. Simplify, if possible. Factor	$= \dfrac{5x+15}{(x+3)}$ $\boxed{x \neq -3}$	$= \dfrac{(x+2)}{(x+2)(x-2)}$
6. Name restrictions.	$= \dfrac{5(x+3)}{(x+3)} = \boxed{5}$	$= \boxed{\dfrac{1}{x-2}}$

Least Common Multiples of Polynomials LCM

LCM

A) $\dfrac{3}{10}$ and $\dfrac{2}{15}$

B) $\dfrac{3}{10}$ and $\dfrac{2}{15}$

"COMMON"

Find the LCM of each pair. denom

5. $2\underline{x^3}\underline{y^4}$ and $3\underline{x^5}\underline{y^3}$ Biggest

$6x^5y^4$ Exponet

6. $12x^3y^7z$ and $30x^5y^4z$

$60x^5y^7z$

LCM of Polynomials

1. (Factor each polynomial completely. Write any repeated factors as powers. For example,

$$x^3 + 6x^2 + 9x = x(x+3)^2.$$

2. List the different factors. If the polynomials have common factors, use the highest power of each common factor.

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7. $x^2 + 3x - 4$ and $x^2 - 3x + 2$

$(x+4)(x-1)$ $(x-1)(x-2)$

LCM

$(x+4)(x-1)(x-2)$ LCM

8. $x^3 - 4x$ and $x^2 + 4x + 4$

$\underline{x(x^2-4)}$ $\underline{(x+2)(x+2)}$

$\underline{x(x+2)(x-2)}$ $(x+2)^2$

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

ADDING WITH UNLIKE DEMOMINATORS

1. Factor the denominators ONLY!

2. Write the COMMON DENOMINATOR, using EACH FACTOR from the first fraction and all FACTORS from the other fractions THAT ARE NOT ALREADY WRITTEN DOWN.

3. Write equivalent fractions by multiplying the first fraction by a VALUE OF 1 in the form of what is needed to make the 1st denominator the same as the common denominator. Repeat for other fractions.

4. Add, and simplify.

9. $\dfrac{(x+3) \cdot x}{(x+3)(x+3)} + \dfrac{2x+6}{x^2+6x+9} \cdot \dfrac{1}{1}$

$(x+3)(x+3)$

$= \dfrac{x^2+3x}{(x+3)(x+3)} + \dfrac{2x+6}{(x+3)(x+3)}$

$= \dfrac{x^2+5x+6}{(x+3)^2} = \dfrac{(x+2)(x+3)}{(x+3)(x+3)}$

$= \boxed{\dfrac{x+2}{x+3}}$

10. $\dfrac{4x}{x^2+3x-18} + \dfrac{4 \cdot (x+6)}{(x-3) \cdot (x+6)}$

$(x-3)(x+6)$

$\dfrac{4x}{(x-3)(x+6)} + \dfrac{4x+24}{(x-3)(x+6)}$

$\dfrac{8x+24}{(x-3)(x+6)} = \boxed{\dfrac{8(x+3)}{(x-3)(x+6)}}$

11. $\dfrac{x}{x+3} + \dfrac{-18}{x^2-9}$

omit

12. $\dfrac{(x-2)}{(x-2)} \cdot \dfrac{(x-7)}{x^2+4x-5} + \dfrac{(9-x)}{x^2+3x-10} \cdot \dfrac{(x-1)}{(x-1)}$

$(x+5)(x-1) \qquad (x+5)(x-2)$

$\dfrac{x^2-9x+14}{(x+5)(x-1)(x-2)} + \dfrac{-x^2+10x-9}{(x+5)(x-1)(x-2)}$

$\dfrac{x+5}{(x+5)(x-1)(x-2)} = \boxed{\dfrac{1}{(x-1)(x-2)}}$

SUBTRACTING WITH <u>UNLIKE DE</u>

1. Distribute the negative to the NUMARATOR ONLY.

2. Factor the denominators ONLY!

3. Find Common Denominators and write equivalent fractions.

4. Add, and simplify.

13. $\dfrac{2x^2-16}{x^2-4} + \dfrac{(-x+4)(x-2)}{x+2\ \ (x-2)}$

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

$\dfrac{2x^2-16 + -x^2-2x+8}{(x+2)(x-2)}$

$\dfrac{x^2-2x-8}{(x+2)(x-2)} = \dfrac{(x-4)(x+2)}{(x+2)(x-2)}$

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15. $\dfrac{2x^2+64}{x^2-64} - \dfrac{x-4}{x+8}$

omit

$\dfrac{(-x-4)(x-2)}{-x^2+2x-4x}$

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