Name: **KEY**   Hour: _____   Date: _____

NOTES: Section 8.5 – Add and Subtract Rational Expressions

Goals: #1 - I can add and subtract rational expressions with common denominators.

#2 - I can find the least common multiple (LCM) of polynomials.

#3 - I can add and subtract rational expressions with uncommon denominators.

Homework: Lesson 8.5 Worksheet

Exploration #1: Work with a partner and add the following fractions.

1. $\frac{3}{5} + \frac{1}{5}$

$$\boxed{\frac{4}{5}}$$

2. $\frac{2}{3} + \frac{2}{3}$

$$\boxed{\frac{4}{3}}$$

3. $\frac{1}{4} + \frac{3}{4}$

$$\frac{4}{4} \quad \boxed{1}$$

Notes:

As with ___fractions___, to ___add___ or ___subtract_____

rational expressions with ___like___ denominators, ___combine_____

their ___numerators___ and keep the common ___denominator___.

Example #1: Perform the indicated operation.

1. $\frac{7}{4x} + \frac{3}{4x}$

$$\frac{10}{4x}$$

$$\frac{5 \cdot 2}{2 \cdot 2 \cdot x} \quad \boxed{\frac{5}{2x}}$$

2. $\frac{2x}{x+6} - \frac{5}{x+6}$

$$\boxed{\frac{2x-5}{x+6}}$$

You practice: Perform the indicated operation.

1. $\frac{2x^2}{x^2+1} + \frac{2}{x^2+1}$

$$\frac{2x^2+2}{x^2+1}$$

$$\frac{2(x^2+1)}{(x^2+1)} \quad \boxed{2}$$

2. $\frac{7}{12x} - \frac{5}{12x}$

$$\frac{2}{12x}$$

$$\frac{2}{3 \cdot 2 \cdot 2 \cdot x} \quad \boxed{\frac{1}{6x}}$$

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Exploration #1: Work with a partner and add the following fractions.

1. $\dfrac{3}{5} + \dfrac{1}{10}$

$\dfrac{6}{10} + \dfrac{1}{10}$

$\boxed{\dfrac{7}{10}}$

2. $\dfrac{7}{10} + \dfrac{1}{3}$

$\dfrac{21}{30} + \dfrac{10}{30}$

$\boxed{\dfrac{31}{30}}$

3. $\dfrac{1}{2} + \dfrac{1}{8}$

$\dfrac{4}{8} + \dfrac{1}{8}$

$\boxed{\dfrac{5}{8}}$

Notes:

As with ___fractions___ , to ___add___ or ___subtract___

rational expressions with ___unlike___ denominators, we need to first rewrite the

expressions to have ___common___ denominators.

Then we can ___add___ or ___subtract___ the rational expressions.

Example #2: Find the least common multiple.

1. $4x^2 - 16$ and $6x^2 - 24x + 24$

$4(x^2 - 4)$ $6(x^2 - 4x + 4)$

$4(x+2)(x-2)$ $6(x-2)(x-2)$

$2 \cdot 2 (x+2)(x-2)$ $3 \cdot 2 (x-2)(x-2)$

$LCM: 2 \cdot 2 \cdot (x+2)(x-2) \cdot 3 \cdot (x-2)$

$\boxed{12(x+2)(x-2)^2}$

You practice: Find the least common multiple.

1. $5x^2 - 45$ and $4x^2 + 24x + 36$

$5(x^2 - 9)$ $4(x^2 + 6x + 9)$

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

          $2 \cdot 2 \cdot (x+3)(x+3)$

$LCM: 5(x+3)(x-3) \cdot 2 \cdot 2 \cdot (x+3)$

$\boxed{20(x+3)^2(x-3)}$

Example #3: Perform the indicated operation.

1. $\dfrac{7}{9x^2} + \dfrac{x}{3x^2 + 3x}$

$\underline{3\cdot3\cdot x\cdot x} \quad \underline{3\cdot x\cdot(x+1)}$

$LCD: 3\cdot3\cdot x\cdot x\cdot(x+1)$

$\qquad \overset{\cdot(x+1)}{\qquad} \quad 9x^2(x+1)$

$\dfrac{7}{9x^2} = \dfrac{7x+7}{9x^2(x+1)} \qquad \overset{\cdot 3x}{\dfrac{x}{3x(x+1)}} = \dfrac{3x^2}{9x^2(x+1)}$

$\overset{\cdot(x+1)}{\qquad}$

$\dfrac{7x+7}{9x^2(x+1)} + \overset{\cdot 3x}{\dfrac{3x^2}{9x^2(x+1)}}$

$\boxed{\dfrac{3x^2+7x+7}{9x^2(x+1)}}$

2. $\dfrac{x+2}{2x-2} - \dfrac{-2x-1}{x^2-4x+3}$

$\quad 2(x-1) \quad (x-3)(x-1)$

$LCD: 2(x-1)(x-3)$

$\dfrac{x+2}{2(x-1)} \overset{\cdot(x-3)}{=} \dfrac{x^2-x-6}{2(x-1)(x-3)}$

$\dfrac{-2x-1}{(x-3)(x-1)} \overset{\cdot 2}{=} \dfrac{-4x-2}{2(x-1)(x-3)}$

$\dfrac{x^2-x-6}{2(x-1)(x-3)} - \dfrac{-4x-2}{2(x-1)(x-3)}$

$\dfrac{x^2+3x-4}{2(x-1)(x-3)} \qquad \dfrac{(x+4)(x-1)}{2(x-1)(x-3)}$

$\boxed{\dfrac{x+4}{2(x-3)}}$

You practice: Perform the indicated operation.

1. $\dfrac{x+1}{x^2+4x+4} - \dfrac{6}{x^2-4}$

$\quad (x+2)(x+2) \quad (x+2)(x-2)$

$LCD: (x+2)(x+2)(x-2)$

$\dfrac{x+1}{(x+2)(x+2)} \overset{\cdot(x-2)}{=} \dfrac{x^2-x-2}{(x+2)(x+2)(x-2)}$

$\dfrac{6}{(x+2)(x-2)} \overset{\cdot(x+2)}{=} \dfrac{6x+12}{(x+2)(x+2)(x-2)}$

$\dfrac{x^2-x-2}{(x+2)^2(x-2)} - \dfrac{6x+12}{(x+2)^2(x-2)}$

$\boxed{\dfrac{x^2-7x-14}{(x+2)^2(x-2)}}$

2. $\dfrac{x}{x^2-x-12} + \dfrac{5}{12x-48}$

$\quad (x-4)(x+3) \quad 12(x-4)$

$LCD: 12(x-4)(x+3)$

$\dfrac{x}{(x-4)(x+3)} \overset{\cdot 12}{=} \dfrac{12x}{12(x-4)(x+3)}$

$\dfrac{5}{12(x-4)} \overset{\cdot(x+3)}{=} \dfrac{5x+15}{12(x-4)(x+3)}$

$\dfrac{12x}{12(x-4)(x+3)} + \dfrac{5x+15}{12(x-4)(x+3)}$

$\boxed{\dfrac{17x+15}{12(x-4)(x+3)}}$

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