Algebra 2 Worksheet **Name:** _____

Section 8.3 – Adding and Subtracting Rational Expressions DAY 3 **Period:** __

I. Add or subtract. Then simplify if possible. Identify **ANY** x-values for which the **ORIGINAL** expression is undefined.

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

$\frac{x-1+x+7}{x+3}$ ← $x \neq -3$

$\frac{2x+6}{x+3}$

$\frac{2\cancel{(x+3)}}{\cancel{(x+3)}}$

2, $x \neq -3$

2. $\frac{3x+2}{x-1}-\frac{x+5}{x-1}$

$\frac{3x+2-(x+5)}{x-1}$ ← $x \neq 1$

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

$\frac{2x-3}{x-1}$

$\frac{2x-3}{x-1}$, $x \neq 1$

3. $\frac{x-1}{x^2-5x-6}-\frac{5}{x^2-5x-6}$

$\frac{x-1-5}{(x-6)(x+1)}$ $x \neq 6, -1$

$\frac{\cancel{(x-6)}}{\cancel{(x-6)}(x+1)}$

$\frac{1}{x+1}$, $x \neq -1, 6$

4. $\frac{x+1}{x}-\frac{x-1}{x+5}$

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

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

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

$\frac{7x+5}{x(x+5)}$

$\frac{7x-5}{x(x+5)}$, $x \neq 0, -5$

5. $\frac{x+1}{x+3}+\frac{2x}{x^2+3x}$

$x(x+3)$

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

$\frac{x^2+x+2x}{x(x+3)}$

$\frac{x^2+3x}{x(x+3)}$

$\frac{\cancel{x}\cancel{(x+3)}}{\cancel{x}\cancel{(x+3)}}$

1, $x \neq 0, -3$

6. $1-\frac{1}{x+4}$

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

$\frac{x+4-1}{x+4}$

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

$\frac{x+3}{x+4}$, $x \neq -4$

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

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

$\frac{2x^2+4x-3x^2+15x}{(x-5)(x+2)}$

$\frac{-x^2+19x}{(x-5)(x+2)}$

$\frac{-x(x-19)}{(x-5)(x+2)}$

$\boxed{\frac{-x(x-19)}{(x-5)(x+2)},\ x \neq -2, 5}$

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

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

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

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

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

$\boxed{\frac{3x^2}{(x+1)(x-1)},\ x \neq -1, 1}$

9. $\frac{3}{x^2-3x-10} - \frac{2}{x^2+2x-35}$

$(x-5)(x+2)$ $(x+7)(x-5)$

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

$\frac{3x+21-2x-4}{(x-5)(x+2)(x+7)}$

$\frac{x+17}{(x-5)(x+2)(x+7)}$

$\boxed{\frac{x+17}{(x-5)(x+2)(x+7)},\ x \neq -7, -2, 5}$

II. Simplify. Assume that all expressions are defined.

10. $\frac{\frac{x-1}{x^2-9}}{\frac{x^2-1}{x^2+3x}}$

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

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

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

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

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

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

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

$1-x$

$-(x-1)$

$\boxed{-(x-1)}$

12. $\frac{\frac{x-2}{4x}}{x^2-5x+6}$

$\frac{\cancel{x-2}}{4x} \cdot \frac{1}{(x-3)\cancel{(x-2)}}$

$\boxed{\frac{1}{4x(x-3)}}$

II. Find the least common multiple for each pair.

4. $50x^2yz^2$ and $40y^5z$

$5 \cdot 5 \cdot 2\, x^2 y z^2$ $2 \cdot 2 \cdot 2 \cdot 5\, y^5 z$

$2^3 \cdot 5^2\, x^2 y^5 z^2$

$\boxed{200x^2y^5z^2}$

5. x^2-5x-6 and x^3-12x^2+36x

$(x-6)(x+1)$ $x(x^2-12x+36)$

$x(x-6)(x-6)$

$\boxed{x(x-6)^2(x+1)}$