Algebra 2 Worksheet **Name:** Key

Section 8.3 – Adding and Subtracting Rational Expressions DAY 2 **Period:** __

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

1. $\frac{5}{x-4}-\frac{2}{4-x}$

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

$\frac{5}{x-4}+\frac{2}{x-4}$

$\frac{7}{x-4}$ ← $x \neq 4$

$\frac{7}{x-4}$, $x \neq$ 4

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

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

$\frac{2x^2-6x+x^2-7x}{(x-7)(x-3)}$

$\frac{3x^2-13x}{(x-7)(x-3)}$

$\frac{x(3x-13)}{(x-7)(x-3)}$ ← $x \neq 3$, $x \neq 7$

$\frac{x(3x-13)}{(x-7)(x-3)}$, $x \neq$ 3, 7

3. $\frac{4x}{x^2-10x+24}-\frac{12}{x-6}$

$\frac{4x}{(x-6)(x-4)}+\frac{-12(x-4)}{(x-6)(x-4)}$

$\frac{4x+-12x+48}{(x-6)(x-4)}$

$\frac{-8x+48}{(x-6)(x-4)}$

$\frac{-8\cancel{(x-6)}}{\cancel{(x-6)}(x-4)}$ ← $x \neq 6$, $x \neq 4$

$\frac{-8}{x-4}$, $x \neq$ 6, 4

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

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

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

$\frac{x^2+1}{x^2}$ ← $x \neq 0$

$\frac{x^2+1}{x^2}$, $x \neq$ 0

5. $\frac{x}{4x+8}-\frac{1}{x^2+2x}$

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

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

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

$x \neq 0, -2$

$\frac{x-2}{4x}$, $x \neq$ 0, −2

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

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

$\frac{5x^2+10x-15+-x^2+4x-3}{(x+2)(x-1)(x+3)}$

$\frac{4x^2+14x-18}{(x+2)(x-1)(x+3)}$

$\frac{2(2x^2+7x-9)}{(x+2)(x-1)(x+3)}$

$\frac{2(2x+9)\cancel{(x-1)}}{(x+2)\cancel{(x-1)}(x+3)}$

$\frac{2(2x+9)}{(x+2)(x+3)}$, $x \neq$ −2, 1, −3

II. Simplify. Assume that all expressions are defined.

7. $\dfrac{\dfrac{2x-5}{x^2-9}}{\dfrac{3x-1}{x+3}}$

$\dfrac{2x-5}{x^2-9} \cdot \dfrac{x+3}{3x-1}$

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

$\boxed{\dfrac{2x-5}{(x-3)(3x-1)}}$

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

$\dfrac{3}{x} \cdot \dfrac{x+2}{2x}$

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

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

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

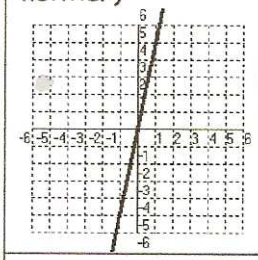
$\dfrac{x+2}{3x} \cdot \dfrac{1}{x^2-4}$

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

$\boxed{\dfrac{1}{3x(x-2)}}$

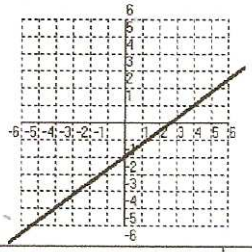
III. Spiraling Review.

10. Given the graph, what type of variation is it? (direct, inverse, or neither)



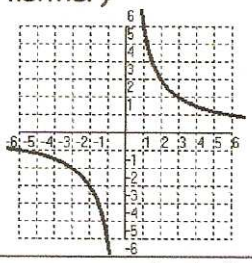
direct (line going through the origin)

11. Given the graph, what type of variation is it? (direct, inverse, or neither)



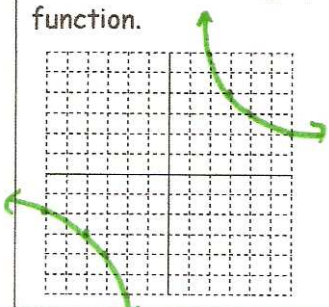
neither

12. Given the graph, what type of variation is it? (direct, inverse, or neither)



inverse

13. Given: y varies inversely as x, and $y=3$ when $x=4$. Write and graph the inverse variation function.



$y = \dfrac{k}{x}$

$3 = \dfrac{k}{4}$

$k = 12$

$\boxed{y = \dfrac{12}{x}}$

14. Find the least common multiple for the following... x^2-1 and $5x-5x^2$

$x^2-1 \longrightarrow (x+1)(x-1)$

$5x-5x^2 \longrightarrow -5x(x-1)$

$\boxed{LCM: -5x(x+1)(x-1)}$

15. Simplify. Assume all expressions are defined.

$\dfrac{x^2-2x-8}{x^3-16x} \div \dfrac{5x+2}{3x+12} \cdot \dfrac{25x^2-4}{x}$

$\dfrac{\cancel{(x-4)}(x+2)}{x\cancel{(x-4)}\cancel{(x+4)}} \cdot \dfrac{3\cancel{(x+4)}}{\cancel{5x+2}} \cdot \dfrac{\cancel{(5x+2)}(5x-2)}{x}$

$\boxed{\dfrac{3(x+2)(5x-2)}{x^2}}$