HONORS Algebra 3-4
Rationals Day 2 HW

Name: _____ Per: ____
Date: _____

Simplify the expressions below. Leave your answer as simplified as possible. Make sure to list any domain restrictions.

1. $\frac{6}{6}\left(\frac{2x-5}{4x}\right)+\left(\frac{4x+2}{6x}\right)\frac{4}{4} = \frac{6x-30}{24x} + \frac{16x+8}{24x} = \frac{22x-22}{24x} = \frac{11x-11}{12x}$

D: $x \neq 0$

2. $\frac{2}{2}\left(\frac{4x-1}{5x}\right)+\left(\frac{x+5}{10}\right)\frac{x}{x} = \frac{8x-2}{10x} + \frac{x^2+5x}{10x} = \frac{x^2+13x-2}{10x}$

D: $x \neq 0$

3. $\frac{x}{x}\left(\frac{3}{4x}\right)+\left(\frac{1}{2x^2}\right)\frac{2}{2} = \frac{3x}{4x^2} + \frac{2}{4x^2} = \frac{3x+2}{4x^2}$

D: $x \neq 0$

4. $\frac{4}{5y-15} + \frac{5}{y^2-9} = \frac{4}{5(y-3)} + \frac{5}{(y+3)(y-3)}\left(\frac{5}{5}\right) = \frac{4y+12}{5(y+3)(y-3)} + \frac{25}{5(y+3)(y-3)}$

	y	$+3$
y	y^2	$3y$
-3	$-3y$	-9

$= \frac{4y+37}{5(y+3)(y-3)}$

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

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

	$2x$	$+1$
$2x$	$4x^2$	$2x$
-1	$-2x$	-1

$= \frac{5x-15}{5(2x+1)(2x-1)} - \frac{4x-2}{5(2x+1)(2x-1)} = \frac{x-13}{5(2x+1)(2x-1)}$

D: $x \neq -1/2, 1/2$

6. $\frac{x-3}{x^2-9x+20} + \frac{2}{x^2-6x+8}$

$= \frac{x-2}{x-2}\frac{x-3}{(x-4)(x-5)} + \frac{2}{(x-4)(x-2)}\left(\frac{x-5}{x-5}\right)$

	x	-4
x	x^2	$-4x$
-2	$-2x$	8

	x	-5
x	x^2	$-5x$
-4	$-4x$	20

$= \frac{x^2-2x-3x+6}{(x-2)(x-4)(x-5)} + \frac{2x-10}{(x-4)(x-2)(x-5)}$

$= \frac{x^2-3x-4}{(x-2)(x-4)(x-5)}$ D: $x \neq 2, 4, 5$

7. $\frac{x}{x^2-4} - \frac{6}{x^2-8x-20}$

$= \frac{x+10}{x+10}\frac{x}{(x+2)(x-2)} - \frac{6}{(x+2)(x-10)}\left(\frac{x-2}{x-2}\right)$

	x	$+2$
x	x^2	$2x$
-2	$-2x$	-4

	x	-10
x	x^2	$-10x$
$+2$	$2x$	-20

$= \frac{x^2-10x}{(x+10)(x+2)(x-2)} - \frac{6x-12}{(x+2)(x-10)(x-2)}$

$= \frac{x^2-16x+12}{(x+10)(x+2)(x-2)}$ D: $x \neq -10, 2, -2$

8. $\frac{x-2}{x^2+5x+4} - \frac{8}{x^2+12x+32}$

$= \frac{x+8}{x+8}\frac{x-2}{(x+4)(x+1)} - \frac{8}{(x+4)(x+8)}\left(\frac{x+1}{x+1}\right)$

	x	$+4$
x	x^2	$4x$
$+1$	$1x$	4

	x	8
x	x^2	$8x$
4	$4x$	32

$= \frac{x^2+8x-2x+16}{(x+8)(x+4)(x+1)} - \frac{8x+8}{(x+4)(x+8)(x+1)}$

$= \frac{x^2-2x-24}{(x+8)(x+4)(x+1)}$ D: $x \neq -8, -4, -1$