Integrated Math 3. 10.3 Solving Rational Equations **Name:**_____
10.3 Homework Day 2

Solve each rational equation. State restrictions before you solve to help identify extraneous solutions.

1. $7+\frac{6}{y}=5$ $y\neq 0$

$\frac{6}{y}=\frac{-2}{1}$

$-2y=6$

$y=-3$

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

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

$x^2-4=5$

$x^2-9=0$

$(x-3)(x+3)=0$

$x=3,-3$

3. $\frac{2x-1}{x+1}=\frac{2x-2}{x}$ $x\neq -1, 0$

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

$2x^2-2=2x^2-x$

$-2=-x$

$x=2$

LCD: x^2

4. $\frac{1}{x}+\frac{1}{x^2}=2$ $x\neq 0$

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

$x+1=2x^2$

$2x^2-x-1=0$

$(2x+1)(x-1)=0$

$x=1,-1/2$

LCD: $y+3$

5. $\frac{5}{y+3}-2=\frac{7}{y+3}$ $y\neq -3$

$y+3\left(\frac{5}{y+3}-2\right)=\left(\frac{7}{y+3}\right)y+3$

$5-2(y+3)=7$

$5-2y-6=7$

$-2y-1=7$

$-2y=8$

$y=-4$

LCD: $x(x-3)$

6. $\frac{9}{x-3}=\frac{27}{x^2-3x}+\frac{6}{x}$ $x\neq 0$ $x\neq 3$

$x(x-3)\left(\frac{9}{x-3}\right)=\left(\frac{27}{x(x-3)}+\frac{6}{x}\right)x(x-3)$

$9x=27+6(x-3)$

$9x=27+6x-18$

$9x=6x+9$

$3x=9$

$x=3$

no solution

LCD: $x(x-3)$

$x\neq 0$

$x\neq 3$

7. $\frac{1}{x}-\frac{2}{x-3}=4$

$x(x-3)\left(\frac{1}{x}-\frac{2}{x-3}\right)=4x(x-3)$

$x-3-2x=4x(x-3)$

$x-3-2x=4x^2-12x$

$-x-3=4x^2-12x$

$0=4x^2-11x-3$

$(4x+1)(x-3)=0$

$x=-1/4$ $x=3$

LCD: $x-2$

$x\neq 2$

8. $\frac{5x}{x-2}-7=\frac{10}{x-2}$

$x-2\left(\frac{5x}{x-2}-7\right)=\frac{10}{x-2}(x-2)$

$5x-7(x-2)=10$

$5x-7x+14=10$

$-2x=-4$

$x=2$

no solution

LCD: $(x+4)(x-1)$

$x\neq -4, 1$

9. $\frac{4x}{x+4}+\frac{3}{x-1}=\frac{15}{x^2+3x-4}$

$(x+4)(x-1)\left(\frac{4x}{x+4}+\frac{3}{x-1}\right)=\frac{15}{(x+4)(x-1)}(x+4)(x-1)$

$4x(x-1)+3(x+4)=15$

$4x^2-4x+3x+12=15$

$4x^2-x-3=0$

$(4x+3)(x-1)=0$

$x=-3/4$