Algebra 2w/ Support Unit 3 **Test Review**: Rational Functions Name: key !!

Solve the following rational equations by hand.

1. $\frac{4}{x-1} = \frac{x+1}{12}$

$48 = (x-1)(x+1)$

$48 = x^2 - 1$

$0 = x^2 - 49$

$0 = (x+7)(x-7)$

$x = 7$ or -7

2. $\frac{x}{x+3} = \frac{3}{19}$

$19x = 3x + 9$

$16x = 9$

$x = 9/16$

3. $\frac{24}{r-3} = \frac{36}{r+3}$

$24r + 72 = 36r - 108$

$+108 \quad +108$

$24r + 180 = 36r$

$-24r \quad -24r$

$\frac{180}{12} = \frac{12r}{12}$

$r = 15$

4. $\frac{10}{r^2-4} - \frac{3}{r-2} = \frac{6}{r+2}$

$10 - 3(r+2) = 6(r-2)$

$10 - 3r - 6 = 6r - 12$

$-3r + 4 = 6r - 12$

$+3r \quad +3r$

$4 = 9r - 12$

$+12 \quad +12$

$\frac{16}{9} = \frac{9r}{9}$

$r = 16/9$

5. $\frac{1}{b^2-7b+10} + \frac{1}{b-2} = \frac{2}{b^2-7b+10}$

$(b-5)(b-2)$

$1 + b - 5 = 2$

$b - 4 = 2$

$b = 6$

Solve the following rational inequalities by hand.

6. $\frac{4}{x} > 3$

$x \neq 0$

$4 > 3x$

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

$0 < x < 1.33$

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

$x \neq 1$

$x + 2 = 4x - 4$

$6 = 3x$

$x = 2$

$x < 1$ $\quad x > 2$

8. $\frac{x^2+3x+2}{x+4} \leq 0$

$x = -4$

$x^2 + 3x + 2 = 0$

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

$x = -2 \quad x = -1$

$x < -4 \quad -2 \leq x \leq -1$

9. $\frac{1}{x} + \frac{3}{4} \geq \frac{1}{2}$

$x \neq 0$

$4 + 3x = 2x$

$4 = -x$

$x = -4$

$x \leq -4$

$x > 0$

10. $\frac{3}{x+2} + \frac{1}{x^2-x-6} \geq \frac{2}{x-3}$

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

$x \neq -2$

$x \neq 3$

$3(x-3) + 1 = 2(x+2)$

$3x - 9 + 1 = 2x + 4$

$3x - 8 = 2x + 4$

$x = 12$

$-2 < x < 3 \quad x \geq 12$

Simplify

11. $\dfrac{2b+6}{b+3}$

$\dfrac{2(b+3)}{b+3}$

2

12. $\dfrac{x^2+17x+70}{x^2+16x+63}$

$\dfrac{(x+10)(x+7)}{(x+9)(x+7)}$

$\dfrac{x+10}{x+9}$

13. $\dfrac{2x^2+13x+6}{5x^3+25x^2-30x}$

$\dfrac{(2x+1)(x+6)}{5x(x^2+5x-6)}$

$\dfrac{(2x+1)(x+6)}{5x(x-1)(x+6)}$

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

14. $\dfrac{6x^2+30x}{7} \cdot \dfrac{7}{x+5}$

$\dfrac{6x(x+5)}{7} \cdot \dfrac{7}{(x+5)}$

$6x$

15. $\dfrac{9m-45}{7m+4} \cdot \dfrac{35m^2+20m}{5m^2-25m}$

$\dfrac{9(m-5)}{7m+4} \cdot \dfrac{5m(7m+4)}{5m(m-5)}$

9

16. $\dfrac{x+2}{x^2+2x-80} \div \dfrac{1}{x+10}$

$\dfrac{x+2}{(x+10)(x-8)} \cdot \dfrac{x+10}{1}$

$\dfrac{x+2}{x-8}$

17. $\dfrac{7n+1}{42n+6} \div \dfrac{15n+15}{50n+50}$

$\dfrac{7n+1}{6(7n+1)} \cdot \dfrac{5 \cdot 10}{15(n+1)}$

$\dfrac{5}{9}$

18. $\dfrac{2x}{2} + \dfrac{5}{2x+8}$

$2(x+4)$

$\dfrac{2x(x+4)+5}{2(x+4)}$

$\dfrac{2x^2+8x+5}{2(x+4)}$

19. $\dfrac{6a}{a-3} - \dfrac{7}{a-2}$

$\dfrac{6a(a-2) - 7(a-3)}{(a-3)(a-2)}$

$\dfrac{6a^2-12a-7a+21}{(a-3)(a-2)}$

$\dfrac{6a^2-19a+21}{(a-3)(a-2)}$

20. $\dfrac{x}{x^2-x-6} - \dfrac{3}{x^2-2x-8}$

$(x-3)(x+2) \quad (x-4)(x+2)$

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

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

$\dfrac{x^2-7x+9}{(x-3)(x+2)(x-4)}$

21. $\dfrac{5}{x^2-9} + \dfrac{x}{x^2-x-12}$

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

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

$\dfrac{5x-20+x^2-3x}{(x-3)(x+3)(x-4)}$

$\dfrac{x^2+2x-20}{(x-3)(x+3)(x-4)}$