Honors Algebra II Name _____

Unit 5A Review – Rational Functions

1. Simplifying Rationals
   a. $\frac{5x^3-30x^2-35x}{x^3+x^2-4x-4}$

2. Multiplying and Dividing Rationals
   a. $\frac{x^2-5x}{x^2+5x+4} \cdot \frac{6x^2+12x+6}{9x^3-45x^2}$
   b. $\frac{36xy^3}{27x^4} \div \frac{12xy}{20y^2}$

3. Adding and Subtracting Rationals
   a. $\frac{x}{2x-2} + \frac{x-5}{x^2-3x-4}$
   b. $\frac{5}{6x^2-12x} - \frac{2}{3x}$

4. Solving Rationals (check for extraneous solutions)
   a. $\frac{1}{r-5} = \frac{7}{2r}$
   b. $\frac{4}{x} + 6 = \frac{1}{x^2}$
   c. $\frac{x-4}{x+2} + \frac{2}{x-2} = \frac{17}{x^2-4}$
   d. $\frac{1}{1+c} - \frac{1}{2+c} = \frac{1}{4}$

5. Graphing Rationals with Transformations of the Parent Function. Graph the following rational functions. Find all characteristics without a calculator.
   (Domain, range, max, min, x/y-intercepts, intervals of increase/decrease/constant, end behavior)
   a. $\frac{1}{x-3} + 2$
   b. $\frac{-1}{2x}$
   c. $\frac{4}{2-x} - 1$

6. Graphing and Characteristics of other Rational Functions. Graph the following rational functions. Find all characteristics without a calculator. (Domain, Asymptotes, Holes, Discontinuities, x/y-intercepts).
   a. $\frac{5x^2-10x}{2x^3-10x^2+12x}$
   b. $\frac{10x^2-40}{2x^2-x-6}$
   c. $\frac{x^3+x^2-9x-9}{x^2-2x-3}$

7. Solving Inequalities. Plot on number line and write answer in interval notation.
   a. $\frac{4}{x-3} > 6$
   b. $\frac{x+6}{x-4} \leq -3$
   c. $\frac{x+1}{x-1} + \frac{2}{x} \geq 1$
   d. $\frac{x-3}{3x} \geq \frac{1}{3x^2+9x} + \frac{1}{x+3}$

8. Verifying Inverses
    a. Verify that $f(x) = \frac{3}{x-2} + 4$ and $g(x) = \frac{3}{x-4} + 2$ are inverse functions of each other.

9. Find the inverse of the following functions. Also find the domain and range of both the original function and the inverse.
    a. $g(x) = \frac{5}{x-4} + 1$
    b. $h(x) = \frac{3x-2}{4x+1}$