1. Solve the following polynomial inequality.

$$4(x^2+2) > 2(x-4)^2 + x^2$$

2. Solve the following rational inequality.

$$\frac{x^2+4x+3}{x-1} > 0$$

3. Find the compositions of the following two functions, $f \circ g$ and $g \circ f$ for

$$f(x) = \frac{2x+1}{x-1}, \quad g(x) = \frac{x+1}{x-2}$$

4. Find the domain of the composition $f \circ g$ from problem 3.

5. Find the inverse of the following function

$$g(x) = \frac{3x+2}{x+2}$$

6. Find the horizontal asymptote and the x and y-intercept of

$$y = 5 \cdot 3^{x-2} + 4$$

7. Solve the following exponential equation

$$e^{x^2} \cdot (e^{-6}) = e^{-3x}$$

8. Find the domain of the following logarithmic function.

$$f(x) = \log_9(x-3) + 1$$

9. Write the following as a single logarithm by making use of log rules

$$\log_3(2x^{-1}) + \log_3(12x^5) + \log_3\left(\frac{2}{3}x^{-3}\right)$$

10. Solve the following logarithmic equation

$$\log_4(-x) + \log_4(6-x) = 2$$

11. Solve the following exponential equation

$$9^x - 3^{x+2} = -1$$

12. Solve the following logarithmic equation

$$2\log_{33}(x) - \log_{33}(7x-1) = 0$$

13. Solve the following exponential equation

$$2^{x-2} = 7^{-11x-11}$$