AP Precalculus - M3Y & M3Z
Rational Functions - Homework 1

1. For each one of the following rational functions, find its domain. Then determine whether its graph has a horizontal asymptote, an oblique asymptote, or neither. Finally, determine whether its graph has vertical asymptotes, holes, or neither.

(i) $f(x) = \dfrac{2x^2 + 8x + 6}{4x^2 + 12x + 8}$

(ii) $g(x) = \dfrac{-x^3 + 11x^2 - 30x}{x^2 - 2x - 15}$

(iii) $h(x) = \dfrac{x^4 + 2x^2 + 1}{x^2 - 2x + 2}$

(iv) $q(x) = \dfrac{(x^2 - 1)(x^2 - 12 + 20)}{(x^2 - 9x - 10)(x^2 - 9x + 18)}$

(v) $S(x) = \dfrac{2x^3 - 3x^2 + 32x + 130}{x^2 - 4x + 26}$

2. Solve the following inequalities. Write the answers as intervals or unions of intervals (the functions refer to the functions from Exercise 1):

(i) $f(x) \geq 0$

(ii) $g(x) < 0$

(iii) $h(x) > 0$

(iv) $q(x) \leq 0$