

# 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.

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

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

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

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

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

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

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

$$(iii) \ h(x) > 0$$

$$(ii) \ g(x) < 0$$

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