IB Mathematics HL 13
Quadratics and Rational Functions Assignment

Due Sunday, November 13, 2016

1. Consider the function $f(x) = 4x^2 - 4x + 3$.

   (a) Complete the square to express f in vertex form.

   (b) Express f in factored form.

2. Consider the function
$$f(x) = \frac{4x^2 - 3}{2x^2 - 2}$$

   (a) Use an algebraic method to determine the x-axis intercepts and any asymptotes of the graph of $y = f(x)$.

   (b) Determine the x-axis intercepts and any asymptotes of the graph of
$$g(x) = \frac{2x^2 - 2}{4x^2 - 3}$$

   (c) Plot the graph of $y = f(x)$ and $y = g(x)$ on the same axes, showing the asymptotes for each function.

3. The function f is an odd function with domain $\mathbb{R}$. Show that $f(0) = 0$.

Bonus 1 Find an expression for a rational function f that has exactly three vertical asymptotes. Plot the graph of f.

Bonus 2 With f and g defined as in question 2, consider
$$h(x) = \frac{1}{f(x)}$$

Explain why h and g are not the same function.