Examples 4.2 – Horizontal and Vertical Asymptotes

1. Find any horizontal asymptotes of the following functions.

   (a) $f(x) = \dfrac{4x^2 - 2x + 7}{3x^2 + 9x - 1}$

   Solution:

   (b) $h(t) = \dfrac{t^4 + t^3 + 5t^2 + 5t}{2t^3 - 3t + 4}$

   Solution:

   (c) $g(x) = \dfrac{3x - 7}{\sqrt{2x^2 + 4x}}$

   Solution:

2. Analyze the behavior on either side of the vertical asymptote $x = 1$ of the function from
   Example 4.1.1, $f(x) = \dfrac{x^2 - x - 2}{3x^2 - 9x + 6} = \dfrac{(x+1)(x-2)}{3(x-1)(x-2)}$. Then view the graph of f near $x = 1$.

   Solution: