For practice only. Not to be submitted.

1. For each of the following functions (with the indicated derivatives), identify all asymptotes, intercepts, local extrema and points of inflection. Determine the intervals on which the function is increasing, decreasing, concave upward, and concave downward. Sketch the graph.

   (a) $f(x) = \dfrac{x^2(x+2)}{(x-1)^3}$, $\quad f'(x) = \dfrac{-x(5x+4)}{(x-1)^4}$, $\quad f''(x) = \dfrac{2(5x+1)(x+2)}{(x-1)^5}$

   (b) $f(x) = \dfrac{2x^2 - 4x + 2}{x^2 + 1}$, $\quad f'(x) = \dfrac{4x^2 - 4}{(x^2+1)^2}$, $\quad f''(x) = \dfrac{24x - 8x^3}{(x^2+1)^3}$

   (c) $f(x) = \dfrac{x+3}{\sqrt{x^2+1}}$, $\quad f'(x) = \dfrac{1-3x}{(x^2+1)^{\frac{3}{2}}}$, $\quad f''(x) = \dfrac{3(2x+1)(x-1)}{(x^2+1)^{\frac{5}{2}}}$