Find the following for \( f(x) = \frac{x^2 + 3x}{x-1} = \frac{x(x+3)}{x-1} \) (if they exist; if they don’t exist, state so). Use this information to graph \( f \).

Note \( f'(x) = \frac{(x-3)(x+1)}{(x-1)^2}, \ f''(x) = \frac{8}{(x-1)^3} \)

[1.5] 1a.) critical numbers: ______________

[1.5] 1b.) local maximum(s) occur at \( x = \) ______________

[1.5] 1c.) local minimum(s) occur at \( x = \) ______________

[1.5] 1d.) The global maximum of \( f \) on the interval \([0, 5]\) is _____ and occurs at \( x = \) ______________

[1.5] 1e.) The global minimum of \( f \) on the interval \([0, 5]\) is _____ and occurs at \( x = \) ______________

[1.5] 1f.) Inflection point(s) occur at \( x = \) ______________

[1.5] 1g.) \( f \) increasing on the intervals ______________

[1.5] 1h.) \( f \) decreasing on the intervals ______________

[1.5] 1i.) \( f \) is concave up on the intervals ______________

[1.5] 1j.) \( f \) is concave down on the intervals ______________

[1.5] 1k.) Equation(s) of vertical asymptote(s) ______________

[4] 1l.) Equation(s) of horizontal and/or slant asymptote(s) ______________

[4.5] 1m.) Graph \( f \)