

To receive credit you **MUST SHOW ALL YOUR WORK.**

1. Compute each of the following limits. If the limit does not exist or is infinite, specify so (2.5pts each).

(a)  $\lim_{x \rightarrow -1} \frac{x^2 + 6x + 5}{x^3 + x^2}$

(b)  $\lim_{x \rightarrow -\infty} \frac{x^2 + 6x + 5}{x^3 + x^2}$

(c)  $\lim_{x \rightarrow 0} \frac{x^2 + 6x + 5}{x^3 + x^2}$

(d)  $\lim_{x \rightarrow 0} \frac{1 - \cos(5x)}{x \tan(3x)}$

2. (Bonus 2 pts) List all asymptotes (vertical and horizontal) for  $f(x) = \frac{x^2 + 6x + 5}{x^3 + x^2}$ .

Briefly justify. Note that in Pb. 1 (a), (b), (c), you computed some limits of this function.