

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 (2.5 pts each).

(a) $\lim_{x \rightarrow 3} \frac{x^3 - 9x}{x^2 - 4x + 3}$

(b) $\lim_{x \rightarrow -\infty} \frac{x^3 - 9x}{x^2 - 4x + 3}$

(c) $\lim_{x \rightarrow 0} \frac{1 - \cos(3x)}{x^2}$

(d) $\lim_{x \rightarrow 2} \frac{2x - 7}{x^2 - 4x + 4}$

2. (Bonus 2 pts) Does the function $f(x) = \frac{x^3 - 9x}{x^2 - 4x + 3}$ have any vertical or horizontal asymptotes?

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