

MA125 Quiz 4

Name: KEY

1) (8 pts) Find the limit:

$$\lim_{x \rightarrow 3^+} \ln(x^2 - 9)$$

as  $x \rightarrow 3^+$ ,  $x^2 - 9$  approaches 0 from the right.

Because of this:

- 1)  $x^2 - 9$  is always  $> 0$ , so  $\ln(x^2 - 9)$  is defined
- 2)  $\ln(x^2 - 9) \rightarrow -\infty$

2) (8 pts) Find the limit:

$$\lim_{x \rightarrow \infty} \frac{x^3 + 5x}{2x^3 - x + 7}$$

$$= \lim_{x \rightarrow \infty} \frac{x^3 + 5x \left(\frac{1}{x^3}\right)}{2x^3 - x + 7 \left(\frac{1}{x^3}\right)} =$$

(OVER)

$$\lim_{x \rightarrow \infty} \frac{1 + \frac{5}{x^2}}{2 - \frac{1}{x^2} + \frac{7}{x^3}} = \frac{1}{2}$$

3) (9 pts) Sketch the graph of a function with the following properties:

$$\lim_{x \rightarrow -2} f(x) = \infty, \quad \lim_{x \rightarrow -\infty} f(x) = 3, \quad \lim_{x \rightarrow \infty} f(x) = -3$$

