

Calculus 1 (201-NYA-05 C3)

Quiz 4

September 20, 2008

Name:

Student Number:

Remember to clearly show all work and indicate your final answers. Part marks may be given for method but answers alone will not receive full marks. Notes are not allowed. You may use a non-programmable calculator.

1. (2 points) Evaluate the following limit.

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

$$= \frac{8}{0^+}$$

$$= -\infty$$

NOTE: $x \rightarrow 3^+$

MEANS $x > 3$

$\therefore 3-x < 0$

1. (8 points) Where is the following function continuous? Remember to clearly explain and justify your answer.

$$f(x) = \begin{cases} x^2 - 3x + 1 & \text{if } x < 5 \\ 4x - 9 & \text{if } x \geq 5 \end{cases}$$

CHECK FOR CONTINUITY AT $x=5$

$$1) f(5) = 4(5) - 9 = 11$$

$$2) \lim_{x \rightarrow 5^-} f(x) = \lim_{x \rightarrow 5^-} x^2 - 3x + 1 = (5)^2 - 3(5) + 1 \\ = 11$$

$$\lim_{x \rightarrow 5^+} f(x) = \lim_{x \rightarrow 5^+} 4x - 9 = 4(5) - 9 = 11$$

$$\therefore \lim_{x \rightarrow 5} f(x) = 11$$

$$3) \lim_{x \rightarrow 5} f(x) = 11 = f(5)$$

$\therefore f$ IS CONTINUOUS AT $x=5$

f IS CONTINUOUS EVERYWHERE ELSE SINCE IT IS A POLYNOMIAL THERE

$\therefore f$ IS CONTINUOUS EVERYWHERE