Math 21A: Quiz 2

(Waldron 2/7/08)

Name : Solutions

This is a closed book, no calculator quiz.

1. (2 points) Find:

$$\lim_{x \to 0^+} \frac{1}{x} = \infty$$

2. (3 points) State: The precise definition of the symbols above.

$\forall M > 0 \quad \exists \delta > 0$ such that if $x - 0 < \delta$ then $f(x) > M$

3. (7 points) Prove: That your answer for the limit found in question 1 is correct.

Proof: Given $M > 0$ let $\delta = \frac{1}{M} > 0$

Assume $x - 0 < \delta$

$\Rightarrow x < \delta$

$\Rightarrow x < \frac{1}{M}$

$\Rightarrow \frac{1}{x} > M$

$\Rightarrow f(x) > M.$

4. (8 points) Find: The slope of $f(x) = x^2 + 1$ at $(2,5)$, then find an equation of the line tangent to the graph there.

$\text{slope}_{\text{at } x} = f'(x) = 2x$

$\text{slope}_{\text{at } 2} = f'(2) = 2(2) = 4$

$y - 5 = 4(x - 2)$

$\boxed{y = 4x - 3}$ equation of tangent line at $(2,5)$