Math 131
Worksheet 1 – January 26, 2009

Name _____

Recall the $\epsilon - \delta$ definition of limit:

$\lim_{x \to a} f(x) = L$ if and only if for every $\epsilon > 0$ there is a $\delta > 0$ such that

$$|x - a| < \delta \implies |f(x) - L| < \epsilon$$

1. Using the $\epsilon - \delta$ definition of limit, show that $\lim_{x \to 2}(3x - 1) = 5$.

2. Using the $\epsilon - \delta$ definition of limit, show that $\lim_{x \to a} g(x) = 0 \iff \lim_{x \to a} |g(x)| = 0$.

3. Using the $\epsilon - \delta$ definition of limit, prove the following version of the Sandwich Theorem: if $L \leq f(x) \leq h(x)$, and $\lim_{x \to a} h(x) = L$, then $\lim_{x \to a} f(x) = L$.

4. Using the $\epsilon - \delta$ definition of limit, prove that if $\lim_{x \to a} f(x) = L$, then $\lim_{x \to a} c \cdot f(x) = cL$ (for any constant c).

5. (A little harder) Using the $\epsilon - \delta$ definition of limit, show that $\lim_{x \to 2} x^2 = 4$.