MATH 101 V2A – Homework

April 1st

State whether each of the following statements are true or false. If true, provide justification. If false, provide a counterexample.

1. If $x > 0$, then $\log(x) = \log(1 + (x-1)) = \sum_{n=0}^{\infty} \frac{(-1)^n (x-1)^{n+1}}{n+1}$.

2. If $f(x)$ is a function which is infinitely differentiable at 0, then its Maclaurin series, $\sum_{n=0}^{\infty} \frac{f^{(n)}(0)}{n!} x^n$, converges to $f(x)$ for all $x \in (-R, R)$ (for some $R > 0$).

3. If $f(x) = \sum_{n=0}^{\infty} a_n x^n$ for all x and $f(x)$ is an *odd* function (that is, $f(-x) = -f(x)$ for all x), then $a_{2k} = 0$ for $k = 0, 1, 2, \ldots$. (Hint: What does the equation $f(-x) = -f(x)$ tell you about $\sum_{n=0}^{\infty} a_n x^n$?)

You do NOT have to hand anything in for this homework assignment, but you may be asked to contribute to the solution on the board. Your grade will be based primarily on participation rather than the correctness of your work, provided you demonstrate that you have attempted the problems.