Math 260

Quiz #4, due Friday, April 26

To earn full credit, you must use correct notation and show your relevant work!

1. Consider the syllogism "Every differentiable function is continuous. The absolute value function is not differentiable. Therefore, the absolute value function is not continuous." Is this valid? Why or why not?

2. (a) Translate "$x^2 - 1$ is even for every odd integer x" into symbols, and give a format for proving this statement.

   (b) Prove that $x^2 - 1$ is even for every odd integer x.

3. For integers a, b, $a|b$ (read as "a divides b") exactly when there is an integer k such that $ka = b$.

   (a) Translate $a|b$ into symbols.

   (b) We define $a \nmid b$ to be the negation of $a|b$. Translate $a \nmid b$ into symbols.

4. Consider the following statement: Suppose a, b, and c are integers and $a|b$ and $b|c$. Then, $a|c$. (Here, we are using the definition of $a|b$ from the previous problem.

   (a) Translate this statement into symbols.

   (b) Give at least three examples where you check to see if this statement is true or not.