MATHEMATICS 101 Section 211
Quiz #7, March 12, 2012
Show all your work. Use back of page if necessary. Calculators are not allowed.

Last Name: **First Name:** **UBC Stud. No.:**

1) State the Monotone Convergence Theorem (also known as the Monotone Sequence Theorem in the textbook). (2 points)

2) True or false. Suppose that $\{a_n\}_{n=1}^{\infty}$ is a sequence such that $\lim_{n\to\infty} a_n = 0$. Is it true that $\sum_{n=1}^{\infty} a_n$ converges? Give a proof if you think this is true or give a counterexample and a brief description as to why your sum in your counterexample diverges. (2 points)

3) Evaluate $\sum_{n=2}^{\infty} \frac{3^n}{5^{n+1}}$. (2 points)

4) Evaluate $\lim_{n\to\infty} \frac{e^n}{n^n}$. (2 points)

5) Give examples of two sequences $\{a_n\}_{n=1}^{\infty}$ and $\{b_n\}_{n=1}^{\infty}$ consisting of all positive terms so that $\lim_{n\to\infty} (-1)^n a_n$ converges and $\lim_{n\to\infty} (-1)^n b_n$ diverges.