

**Mathematics 3790H – Analysis I: Introduction to analysis**  
TRENT UNIVERSITY, Winter 2012

**Assignment #4**

**Series business at last!**

*Due on Thursday, 9 February, 2012.*

1. Show that the alternating harmonic series  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n}$  converges *without* using the Alternating Series Test. [5]
2. Suppose  $a_n$  is a non-increasing sequence of positive terms such that  $\sum_{n=0}^{\infty} 2^n a_{2^n}$  converges. Show that  $\sum_{n=0}^{\infty} a_n$  also converges. [5]

NOTE: Both of these can be done with the help of some (different!) rewriting trickery and the Comparison Test.