Mathematics 3790H – Analysis I: Introduction to analysis
TRENT UNIVERSITY, Winter 2014

Assignment #4
Due on Friday, 7 February, 2014.

1. Show that for any bounded sequences $\{a_n\}$ and $\{b_n\}$,

$$\limsup_{n\to\infty} (a_n + b_n) \leq \limsup_{n\to\infty} a_n + \limsup_{n\to\infty} b_n \,,$$

and give an example to show that equality might not happen. *[5]*

2. What is the inequality for $\liminf$ corresponding to the one given above? *[1]*

3. Find a closed form (*i.e.* a formula in terms of n, α, r, and β) for the finite sum

$$\sum_{i=1}^{n} \frac{\alpha r + \beta}{k(k+1)(k+2)} \,. \quad \textit{[4]}$$