Mathematics 3790H − Analysis I: Real analysis
Trent University, Winter 2015

Assignment #10
More uniform convergence
Due on Friday, 27 March, 2015.

Recall from class and the textbook that a series of functions $\sum\limits_{k=0}^{\infty} f_k(x)$ *converges uniformly* to a function $S(x)$ on an interval I if for any $\varepsilon > 0$ there is an N such that for all $n \geq N$ and all $x \in I$, $|S_n(x) - S(x)| < \varepsilon$, where $S_n(x) = \sum\limits_{k=0}^{n} f_k(x)$ for each $n \geq 0$.

1. Suppose that for all $k \geq 0$ and $x \in I$, $|f_k(x)| \leq a_k$, and that $\sum\limits_{n=0}^{\infty} a_k$ converges. Show that $\sum\limits_{k=0}^{\infty} f_k(x)$ converges uniformly on I. *[10]*