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

Assignment #3
Due on Friday, 31 January, 2014.

1. Suppose $\{s_n\}$ and $\{t_n\}$ are sequences such that $\lim_{n\to\infty} s_n = \infty$ but $\lim_{n\to\infty} s_n t_n = L$ for some $L \in \mathbb{R}$. Show that $\lim_{n\to\infty} t_n = 0$. *[5]*

NOTE: Since dividing by 0 or ∞ is not allowed, using the limit laws (a.k.a. the algebraic properties of limits) is not enough here.

2. Find a sequence $\{r_n\}$ such that $\lim_{n\to\infty} (r_n - r_{n+1}) = 0$ which does *not* converge. *[5]*