The University of Waikato
Department of Mathematics

Elements of Analysis math252-08B 2008 Assignment 1

Due Wednesday 23rd July: Please hand back your completed assignment through the slot for this paper outside the Mathematics Office G3.19.

It should be written up neatly and on no more than four sides of an A4 page or the equivalent.

1. Solve the inequality $|x^2 + x - 2| < 1$ for x.

2. Prove that $b = \mathrm{glb}S$ if (a) b is a lower bound for S and (b) for all $\epsilon > 0$ there exists an $x \in S$ such that $b \leq x < b + \epsilon$.

3. Let $S = \{4 - \frac{2}{n} : n = 1, 2, 3, \cdots\}$. Prove that

$$4 = \mathrm{lub}S, \quad 2 = \mathrm{glb}S.$$

4. Let a sequence (a_n) be defined by

$$a_n = \frac{3n+1}{n+4}$$

Given $\varepsilon > 0$ find an $N_\varepsilon \in N$ such that

$$|a_n - 3| < \varepsilon$$

Kevin Broughan
16th July 2008