

The University of Waikato  
Department of Mathematics

Elements of Analysis math252-09B 2009 Assignment 1

**Due Wednesday 22nd 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. Find all of the real numbers  $x$  such that

$$x + 1 < |x - 1|.$$

2. Prove that if  $a < b < 0$  then inversion reverses the order i.e.

$$\frac{1}{b} < \frac{1}{a}.$$

3. Let the subset  $S \subset \mathbb{R}$  be given by  $S = (2, 4] \cup \{5\}$ . Prove that

$$\text{glb } S = 2 \text{ and } \text{lub } S = 5.$$

4. Let  $A$  and  $B$  be non-empty subsets of  $\mathbb{R}$  with  $A \subset B$  and suppose that  $B$  is bounded above. Prove that  $\text{lub } A \leq \text{lub } B$ .

Kevin Broughan  
14th July 2009