

The University of Waikato
Department of Mathematics

Elements of Analysis math252-10B Tutorial 1, 22nd July 2010

Name: _____

Hand in this sheet at the end of the Tutorial. Your name will be noted, but the working will not be assessed.

1. Find all the real numbers x such that

$$|x - 2| \leq 3 \text{ and } x \geq 0.$$

2. Find all the real numbers x such that

$$\left| \frac{x}{x+2} - 2 \right| < 2.$$

3. Given $\epsilon > 0$ find an explicit expression for $N_\epsilon \in \mathbb{N}$ such that for all $n \geq N_\epsilon$, $|a_n - 0| < \epsilon$ when

$$a_n = \frac{2}{n+4},$$

using the method of “working back”.

4. If $\lim_{n \rightarrow \infty} a_n = L$, show using the definition of the limit of a sequence that $\lim_{n \rightarrow \infty} 2a_n = 2L$ and then that $\lim_{n \rightarrow \infty} |a_n| = |L|$.