THE CHINESE UNIVERSITY OF HONG KONG
DEPARTMENT OF MATHEMATICS

MATH1010G/H University Mathematics 2014-2015
Assignment 1

- Due date: 29 Jan, 2015 (before 17:00)
- Remember to write down your name and student number

Exercise 10.1: 31, 45, 69

Exercise 2.2: 33, 39

1. Let $\{a_n\}$ be a sequence of positive real numbers, which is defined by

$$a_1 = 1 \qquad \text{and} \qquad a_n = \frac{12a_{n-1} + 12}{a_{n-1} + 13}, \text{ for } n > 1.$$

   (a) Prove that $a_n \leq 3$.

   (b) Prove that $\{a_n\}$ converges and hence find its limit.

2. By using sandwich theorem, find

$$\lim_{n\to\infty} \left(\frac{1}{\sqrt{n^2+1}} + \frac{1}{\sqrt{n^2+2}} + \cdots + \frac{1}{\sqrt{n^2+n}} \right).$$