MTH101A: 2021 - 2022

Mock Exam: Question 1

Time: 6:00 - 6:30 pm

Q1. (a) Consider a sequence of positive real numbers (x_n) such that $1 \leq x_1 \leq x_2 \leq 3$ and $x_{n+1}^2 = x_n x_{n-1}$ for all $n \geq 2$. Show that (x_n) is a Cauchy sequence.

[7 marks]

(b) Let $x_n = 2 + (-1)^n$ for $n \in \mathbb{N}$. Show that $\lim_{n\to\infty}(x_1 x_2 \ldots x_n)^{\frac{1}{n}} = \sqrt{3}$.

[8 marks]