MAS242 ANALYSIS I QUIZ 1

Problem 1. *(15 points) Prove that*
a sequence $\{x_n\}$ converges in $\mathbb{R}$ if and only if each of its proper subsequences is Cauchy.

Problem 2. *(15 points) Fix any $c > 0$. Let x_1 be any positive number and define $x_{k+1} = \sqrt{(x_k^2 + c/x_k^2)/2}$.*

(1) *Prove that $\{x_k\}$ converges.*

(2) *Use this sequence to calculate $\sqrt{2}$, accurate to two decimal places.*