Course: Commutative Algebra

Homework 1

Let R be the ring of all continuous functions from $[0,1]$ to $\mathbb{R}$ and for each $c \in [0,1]$, let $M_c = \{f \in R | f(c) = 0\}$.

1. Prove that M_c is a maximal ideal of R.

2. Prove that if M is any maximal ideal of R, then there is a real number $c \in [0,1]$ such that $M = M_c$.

3. Show that if $b \neq c$, where $b, c \in [0,1]$ then $M_b \neq M_c$

4. Is $M_c =< x - c >$ or M_c finitely generated?