Turn in #3

(a) If $\phi : \mathbb{Q}(i) \to \mathbb{Q}$ is a homomorphism, show that $\phi(x) = 0$ for all $x \in \mathbb{Q}(i)$.

(b) If R is commutative and $char(R) = 2$ prove that $f : R \to R$ given by $f(x) = x^2$ is a ring homomorphism.

What if R is non-commutative, for example $R = M_2(\mathbb{Z}_2)$?

[10 points]