Math 835 Homework 1

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1 Chapter 13

1.1 Chapter 1

1. Show that $p(x) = x^3 + 9x + 6$ is irreducible in $\mathbb{Q}[x]$. Let θ be a root of $p(x)$, find the inverse of $1 + \theta$ in $\mathbb{Q}(\theta)$.

   Proof. By the Eisenstein criterion, let $p = 3$, $p \mid 9$ and $p \mid 6$ but $p^2 = 9 \nmid 6$ and $p \nmid 1$.

   QED

3.