MATH 24
Homework 2
Assigned Wednesday, March 31.
Due Friday, April 9.

Problem 1 Show that $\mathbb{Q}[\sqrt{2}] = \left\{a + b\sqrt{2} : a, b \in \mathbb{Q}\right\}$ is a field.

Problem 2 Prove the following: A function f is invertible iff it is injective and surjective.

Problem 3 Prove the following about sets A, B, and C.

1. If $A \subseteq B$ and $B \subseteq C$, then $A \subseteq C$.
2. If $A \subseteq B$, then $A \cup C \subseteq B \cup C$.
3. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (For this one, remember that to prove set equality you prove two set containments: see Proposition 1.8 of the notes).