Math 432 Graded Homework 1 Due Wednesday 1/9/08

1. Prove: Every field is an integral domain.

2. Let $R$ be a commutative ring with unity. Prove:
   (a) The set $U$ of units of $R$ is an abelian group.
   (b) If $ab$ is a unit of $R$, then $a$ and $b$ are units of $R$.

3. Show $S = \{m + n\sqrt{3} \mid m, n \in \mathbb{Z}\}$ is a subring but not an ideal of $\mathbb{R}$.