Course: Commutative Algebra

Homework 7 (due to next Friday, 4/13/2012)

All rings are assumed commutative with identity.

1. Let $I = (2x, 3y) \lhd \mathbb{Z}[x, y]$. Find the saturation of I with respect to $\mathbb{Z} - \{0\}$.
2. Prove that if R is an integral closed integral domain and D is any multiplicatively closed subset of R containing 1, then $D^{-1}R$ is integrally closed.
3. Suppose $P \subseteq Q$ are prime ideals in R. Prove that R_P is isomorphic to the localization of R_Q at the prime ideal PR_Q.
4. Let A be a subring of a ring B, and let C be the integral closure of A in B. Let f, g be monic polynomials in $B[x]$ such that $fg \in C[x]$. Then f, g are in $C[x]$.