MATH 725
FALL 2006
HOMEWORK 6

Due Monday, December 4, 2006.

1. (5 pt) Show that if $R[x]$ is an AP-domain, then R must be integrally closed (is the converse true?).

2. Let V be a valuation domain.
   a) (5 pt) Show that V is an AP-domain.
   b) (5 pt) Show that V has atoms if and only if the maximal ideal of V is principal.
   c) (5 pt) Give an example of an atomic valuation domain.
   d) (5 pt) Give an example of a nonatomic valuation domain with atoms.
   e) (5 pt) Give an example of an antimatter valuation domain of dimension 1 and an antimatter valuation domain of dimension greater than 1.

3. (5 pt) Give an example of a non-integrally closed AP domain and use this to give an example of an AP-domain, R, such that $R[x]$ is not an AP-domain.