

**MATH 724**  
**SUMMER 2010**  
**HOMEWORK 3**

*Due Monday, August 2, 2010.*

1. (5 pt) Let  $R$  be a domain with quotient field  $K$  and  $I, J, L$  fractional ideals of  $R$ .
  - (1) (5 pt) Show that if  $I$  is divisorial, then so is  $I : J$ .
  - (2) (5 pt) Show that  $I : JL = (I : J) : L$ .
  - (3) (5 pt) Show that  $(I : J)L \subseteq I : (J : L)$ .
  - (4) (5 pt) Show that  $R : ((R : I)I) = (R : I) : (R : I)$
  
2. (5 pt) Show that if  $I \subseteq R$  is an ideal that is maximal with respect to being divisorial, then  $I$  is prime.