

## Homework 9 – due 10/31/07

### Math 600

42. Dummit-Foote, 9.1, #9
43. Dummit-Foote, 9.1, #13.
44. Dummit-Foote, 9.1, #17.
45. For all primes  $p$ , give the factorization of  $X^4 + 1$  in  $\mathbb{F}_p[X]$ .
46. (5 points) Show that  $\mathbb{Q}$  is not a free  $\mathbb{Z}$ -module.
47. We say a domain  $R$  (with fraction field  $F$ ) is *integrally closed* provided that if  $r \in F$  satisfies a monic polynomial in  $R[X]$ , then  $r \in R$ . Show that any UFD is integrally closed.
48. Dummit-Foote, 10.3, #2.