

MINI-MIDTERM II

DUE IN CLASS MONDAY MARCH 29, 2010

Please **carefully** write up a solution to the following problem; either type, or write **very neatly**. Please bring the problem, stapled, to class Monday March 29, 2010. You may use your textbook, and class notes. You may consult me with any questions. Please **do not consult anyone or anything else in solving this problem**.

PROBLEM

Let p be a prime and let $E = \mathbb{Z}_p(t)$ where t is an indeterminate. Let $F = \mathbb{Z}_p(t^p) \subseteq E$. Show that

$$1 = [E : F]_s < [E : F] = p.$$

[Hint: you may find it useful to show directly that $1, t, t^2, \dots, t^{p-1} \in E$ are linearly independent over F .]