MINI-MIDTERM III

DUE IN CLASS MONDAY APRIL 12, 2010

Please **carefully** write up a solution to **one** of the following problems; either type, or write **very neatly**. Please bring the problem, stapled, to class Monday April 12, 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 1

Show that S_n is generated by $\{(1,2),(1,2,\ldots,n)\}$ and that if p is a prime, then S_p is generated by $\{\tau,(1,2,\ldots,p)\}$ for any transposition τ.

Problem 2

Let F be a field of characteristic zero and $n>0$ an integer. Assume there exists a primitive n-th root of unity in F. Show that if $a\in F$ and $\alpha\in\bar{F}$ is a root of $x^n-a\in F[x]$, then $F(\alpha)$ is a cyclic extension of F.

Date: April 9, 2010.