MATH 251: ABSTRACT ALGEBRA I
IN CLASS REVIEW, EXAM #2

Problem A. How many elements in S_6 are conjugate to $(1\ 2\ 3)(4\ 5)$?

Problem B. Let N be a normal subgroup of a group G of prime index p. Show that if H is a subgroup of G with $H \supset N$, then either $H = N$ or $H = G$.

Problem C. Let G be a group and let $g \in G$ be an element of order 2. Suppose that G acts on a finite set X, and consider the resulting permutation representation $\phi : G \to S_X$. Show that $\phi(g)$ can be written as the product of disjoint transpositions.