

## Questionnaire, to be returned no later than Tuesday, August 28th.

1. Your NAME (please write the first name the way you want me to address you).
2. What was (is) your undergraduate institution?
3. List all algebra or algebra related courses you have taken so far (since you started college).
4. Please describe the extent of your familiarity with each of the following concepts/topics. You may answer briefly (comfortable; familiar but not comfortable; not familiar), or you may give a detailed description.

**Part I:** These are standard topics, and it is expected that all of them were discussed in your undergraduate abstract algebra course. They will NOT be covered 7751, maybe apart from a very brief review. If you are not comfortable with any of these topics, you should spend additional time reviewing it.

(A) Basic set theory: sets, subsets, mappings, injective/surjective/bijective, equivalence relations and equivalence classes.

(B) Congruences; the ring of congruence classes  $\mathbb{Z}_n$  and its basic properties.

(C) Basic examples of groups: cyclic  $\mathbb{Z}_n$ , dihedral  $D_n$ , symmetric  $S_n$ , alternating  $A_n$ , matrix groups  $SL_n(R)$ ,  $GL_n(R)$ , where  $R$  is a ring.

(D) Cosets, normal subgroups (two definitions), quotient groups, Lagrange theorem.

(E) Direct products of groups (internal and external), homomorphisms, isomorphisms, automorphisms.

(F) The four isomorphism theorems for groups

(G) Rings and fields, basic examples, ideals, polynomial rings.

**Part II:** These are topics that are often covered in an advanced undergraduate algebra course. I do not assume your familiarity with them, but it will be helpful for me to know whether you have seen them before.

(A) Group actions

(B) Sylow theorems

(C) Principal ideal domains (PID) and Unique factorization domains (UFD)

(D) Free groups; Cayley graph of a group; defining groups by generators and relations