Algebra Autumn 2013
Frank Sottile
15 October 2013

Sixth Homework

Hand in to Frank Thursday 17 October:

33. Suppose that a group G has an element x with exactly *three* distinct conjugates. Show that G is not simple.

    Prove the same result if G has an element x with exactly *four* distinct conjugates.

    Fact: This result remains true if G has an element with exactly five conjugates.

Hand in for the grader Thursday 17 October:

34. How many elements of order seven are there in a simple group of order 168?

35. Let p be a prime number and C a subgroup of the symmetric group S_p of order p. Use the orbit-stabilizer theorem to determine the cardinality of the normalizer in S_p of C.

36. Show that no group of order 72 is simple.

37. Show that no group of order 192 is simple.