

SF2729 GROUPS & RINGS

HOMEWORK 5: FACTOR GROUPS

1. Let  $A_4$  be the alternating group of degree four. Find all its subgroups. Indicate which are normal and compute the corresponding factor groups. In this exercise, a group is “computed” when it is shown to be isomorphic to some well-known group. (Hint: The order of  $A_4$  is 12; using Lagrange’s theorem, organize the hunt for subgroups utilizing the divisors, 2, 3, 4, 6 of 12. Note that any group of prime order must be cyclic and recall that the order of a permutation is the least common multiple of the lengths of its cycles.)