MATH 150A: HOMEWORK #4

DUE: FRIDAY OCTOBER 28TH

Key concepts: left and right cosets, Lagrange's Theorem, index of the kernel, multiplicative property of the index, left cosets = right cosets for normal subgroups, modular arithmetic

- Read sections 2.8 and 2.9 from *Artin*.
- **Written assignment:** Do exercises 8.1 (25 points), 8.3 (25 points), 9.2 (25 points) on pages 72–73 of *Artin* and the following exercise, which was also on the list of practice problems (25 points).

A. Let G be group with 25 elements, G' a group with 21 elements and let φ be a group homomorphism from G to G'. Prove that

$$\varphi(x) = 1_{G'},$$

for all $x \in G$. Here, $1_{G'}$ denotes the identity element of G'.

Please read and follow the homework policy on the course website. Write your name clearly on each sheet and staple the sheets.