Homework 3

Due on: February 10.

Problem 1

Is the centralizer Z_a of a group element a in a group G in general a normal subgroup of G?

Problem 2

Write down the classes of the dihedral group D_4. Check that the order of each class is a divisor of $|D_4|$. Check in the following two cases that $|Z_a|$ is a divisor of $|D_4|$, and that $|G| = |Z_a||C_a|$.

$$a = (1234) \text{ and } a = (12)(34).$$

Problem 3

What are the normal subgroups of D_4?
Hint: Use the theorem that a normal subgroup consists of entire classes. So begin with a class and impose closure.