FYMM 3/Fall 2012 Problem set 4

To be returned on Wednesday, October 3, 10.15am at latest

1. Find all characters of irreducible representations of the cyclic group C_n (which consists of powers of $e^{\cdot 2\pi i/n}$).

2. Find all conjugacy classes in the dihedral group D_n.

3. On the bases of the previous exercise we know the number of inequivalent irreducible representations of D_n. Find first all 1-dimensional representations. It turns out that the rest of the irreps are 2-dimensional. Compare with the number of conjugacy classes in D_n! Check that the characters indeed form an orthogonal set.

4. Let G be the group of all invertible real $n \times n$ matrices A such that $A_{ij} = 0$ for $i > j$ and $A_{ii} = 1$. Define a left invariant integration on G. Hint: Try first $n = 2, 3$. You just need to use the standard invariance properties of integration in an Euclidean space $\mathbb{R}^k$. Is the integral also right invariant?