Sheet 6

The homework is to be handed in on **Monday 2 March 2015** *at the beginning of the problem class.*

1. Let D_{14} be the group of symmetries of a regular heptagon (dihedral group D_{14}).
   (a) Write the elements of D_{14} as permutations and find the order of each element.
   (b) Find all the subgroups of D_{14}.
2. The following message was encrypted using the public key $\{23, 55\}$. Find the private key and decode the coded message:

$$\text{code} = 2.$$

3. Calculate 7^{2000}, 121^{199} and $13^{82} \mod 300$.
4. Solve the congruence

$$y^{29} \equiv 1 \bmod 245.$$