PHYS 607: Math Methods, Assignment 11
Due 12/01/03

1. Prove the Lagrange theorem: The order of a subgroup is a divisor of the order of the group.

2. Exercise 4.7.3 in Arfken-Weber.

3. Exercise 4.7.5 in Arfken-Weber.

4. Group $D_4$ consists of a fourfold rotation axis and four twofold ($180^\circ$) rotation axes perpendicular to it.
   
   (a) Find a geometrical figure for which $D_4$ is the exact symmetry group.
   
   (b) Find the group multiplication table.
   
   (c) Find a two-dimensional representation of this group and determine whether this representation is reducible.