Additional Group Problems Assignment 19

1. Consider the group D_4 and the subgroup C_4.

   (a) What is a simple way to describe the coset $V \cdot C_4$ in terms of C_4 (i.e. don't use the word "flip").

   (b) Use this description to show that $V \cdot C_4 = C_4 \cdot V$

   (c) Prove that if G is a group and $H \leq G$ with $|G : H| = 2$ then $H \trianglelefteq G$.

2. (a) Let G_1 and G_2 be groups and suppose e_2 is the identity of G_2. Show that $G_1 \oplus \{e_2\} \cong G_1$.

   (b) Without proof just state a subgroup of $G_1 \oplus G_2$ that is isomorphic to G_2.