Math 145 Practicum

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On November 17 the exam will be in Jackson 006.
Let G be a finite group and H be a subgroup of G.

Question 1. Show that the number of left cosets of H is equal to the number of right cosets of H.

Question 2. Show that if H has index 2 then H is normal.

Question 3. Show that if $h \in H$ then $hH = Hh = H$.

Question 4. Determine which $x, y \in G$ satisfy $xH = yH$.

Question 5. Let H be a normal subgroup of G. Define a group operation on the right cosets of H. Call this group $H\backslash G$. Show that G/H is isomorphic to $H\backslash G$.

Question 6. For each group G and subset H show that H is a normal subgroup of G and say which group we have already discussed this semester G/H is isomorphic to:

- $G = \mathbb{Z}$, $H = \langle 2, 5 \rangle$
- $G = D_5$, $H = \langle r \rangle$
- $G = A_4$, $H = \{e, (12)(34), (13)(24), (14)(23)\}$

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