M 431: Assignment 4

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Problem. If A, B are subgroups of G such that $b^{-1}Ab \subset A$ for all $b \in B$, show that AB is a subgroup of G.

Proof.

$\square$

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Problem. Find all the distinct conjugacy classes of S_3.

Proof.

$\square$

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Problem. Let G be the dihedral group of order 8. Find the conjugacy classes in G.

Proof.

$\square$

Heisenberg group problem

Problem. Find the center of our new friend, the Heisenberg group,

$$\mathbb{H}_3(\mathbb{R}) := \left\{ \begin{bmatrix} 1 & x & z \\ 0 & 1 & y \\ 0 & 0 & 1 \end{bmatrix} \mid x, y, z \in \mathbb{R} \right\}$$

Proof.

$\square$

Crayon the clock

Problem. Let G be equal to $\mathbb{Z}_{15} := \{0, 1, 2, ..., 14\}$. Draw it some way. Find a subgroup H of order $|H| = 5$ and then color differently all the different subsets of $\mathbb{Z}_{15}$ of the form aH. (How many are there?) If you have more crayons, do another drawing for an H with $|H| = 3$.

Proof.

□