Group exercises for points

We suppose we saw the 'clock' problem on EX1 of the regular 12-gon. Its group, also known as D_{12} , has 24 transformations, and can be generated by the transformations

- ρ , which rotates the 'clock' by one hour forward
- σ , which reflects the 'clock' over the *x*-axis line through hours 3 and 9.

The domain of D_{12} equals $\{1, \rho, \rho^2, \rho^3, \rho^4, \rho^5, \rho^6, \rho^7, \rho^8, \rho^9, \rho^{10}, \rho^{11}, \sigma, \rho\sigma, \rho^2\sigma, \rho^3\sigma, \rho^4\sigma, \rho^5\sigma, \rho^6\sigma, \rho^7\sigma, \rho^8\sigma, \rho^9\sigma, \rho^{10}\sigma, \rho^{11}\sigma\}$. So $D_{12} = \langle \rho, \sigma \rangle$, the group generated by ρ and σ . We easily verify that $\rho^{12} = 1$ and $\sigma^2 = 1$ and $\sigma\rho = \rho^{11}\sigma$.

EX1 assignment: Find the following subgroups, each time by giving an invariant for the subgroup as we did in class, and generators (so you don't have to list all elements each time):

A subgroup of size 1. Two subgroups of size 2. A subgroup of size 3. Two subgroups of size 4. Two subgroups of size 6. Two subgroups of size 8. Two subgroups of size 12. A subgroup of size 24.

Handwritten answers, due by Wednesday 23 October 2024.