Day 19 homework - Assigned 2/28 and due 3/6

Starred problems below are extra-credit for undergraduates and required for graduate students.

6. Let $G = D_4$, and for $g \in G$, let T_g denote the permutation $T_g(x) = gx$ from the proof of Cayley's theorem.

(a) Write out the cycle decompositions of $T_{R_{90}}$, T_H and T_D as permutations of the eight element set $\{R_0, R_{90}, R_{180}, R_{270}, H, V, D, D'\}$.

(b) Show the calculation that verifies that $T_H T_{R_{90}} = T_D$.

7. Let G be a group, $g \in G$ and let T_g be the permutation $T_g : G \to G$ given by $T_g(x) = gx$ (as in the proof of Theorem 6.1). Show that if one computes the cycle decomposition of T_g, then all the cycles have length $|g|$.