GALOIS THEORY 2015/2016 EXERCISE SHEET 13

Questions marked with an asterisk are optional. Think of them as a christmas present.

(1) Give an example, with justification, of a polynomial in $\mathbb{Q}[x]$ whose Galois group is D_6.
(2) Give an example, with justification, of a polynomial in $\mathbb{Q}[x]$ whose Galois group is S_7.
(3) * Show that any subgroup of S_n which acts doubly transitively on $\{1, \ldots, n\}$ and contains a transposition is equal to S_n. Deduce that for any n there is an extension of $\mathbb{Q}$ which is Galois with group S_n.

Comments, corrections, questions etc to netandogra@gmail.com.