GALOIS THEORY 2015/2016 EXERCISE SHEET 12

Exercises marked with a star are entirely optional.

(1) Show that the following Galois extensions are radical (you not need to find generators of the extensions):
   (a) The splitting field of the polynomial $(x^4 + 13ax + 1)(x^3 + a^2x + 2)$ over the field of a fractions $\mathbb{Q}(a)$ of a polynomial algebra in one variable.
   (b) The splitting field of the polynomial $x^{20} + ax^{15} + bx^{10} + cx^5 + d$ over the field of fractions $\mathbb{C}(a, b, c, d)$ of a polynomial algebra in four variables.

(2) (a) Find the Galois group of $x^5 - 8x^2 + 2$ over $\mathbb{Q}$.
   (b) Find the Galois group of $x^5 + 3x^2 + 2x + 3$ over $\mathbb{Q}$.
   (c) * Find the Galois group of $x^5 + 4x + 1$ over $\mathbb{Q}$.

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