Reading/Blogging Assignments

Come to class on

1. Wednesday having (re)read 4.3 up through the proof of the Main Theorem of Galois Theory
2. Friday read the rest of 4.3
3. Monday having read 4.4

Problem Set 10, Due November 22

Feel free to do some experimentation via a computer algebra system to develop intuition for the problem.

1. Let K/k be finite. Show the following are equivalent:
   (a) $\#\mathrm{Aut}(K/k) = [K : k]$,
   (b) $K^{\mathrm{Aut}(K/k)} = k$
   (c) K/k is separable and normal, and
   (d) K is the splitting field for some polynomial in $k[x]$.
2. Work out the Galois correspondence for the extension $\mathbb{Q}(\sqrt[3]{2}, \zeta_3)/\mathbb{Q}$. Check the following:
   (a) Its Galois group is isomorphic to S_3.
   (b) S_3 has 3 subgroups of order 2 and one subgroup of order 3.
   (c) Make a diagram indicating the subgroups of S_3.
   (d) Using this diagram, find the possible intermediate fields in the extension.