

MATH 535

HOMEWORK ASSIGNMENT 11

due on Monday, 12/06/04

32. In the Galois correspondence, suppose that K_i is the fixed field of the subgroup H_i , $i = 1, 2$.

- (1) Prove that the group corresponding to $K = K_1 \cap K_2$ is the group generated by H_1 and H_2 , i.e. the group consisting of all finite products of elements in H_1 or H_2 .
- (2) Prove that the fixed field of $H_1 \cap H_2$ is the field $K_1 K_2$, the composite of K_1 and K_2 .

33. Find the Galois group of the extension $\mathbb{Q}(\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{7})$ over \mathbb{Q} .

34. Let E be a splitting field for $f(x) = x^n - a$ over F , where $a \neq 0$, and assume that the characteristic of F does not divide n . Show that E contains a primitive n^{th} root of unity.