

HW 5

due May 18

1. Let $F = \mathbb{C}(t^4) \subset L = \mathbb{C}(t)$, where t is a formal variable. Compute the Galois group $\text{Gal}(L/F)$, determine its subgroups and the corresponding intermediate subfields.
2. (a) Determine the Galois group of $(x^2 - 2)(x^2 - 3)(x^3 - 5)$ and find all the subfields of its splitting field.
(b) Use the first part to find a primitive element of the splitting field.
3. Find fields F_1, F_2, F_3 such that $\mathbb{Q} \subset F_1 \subset F_2 \subset F_3$, $[F_3 : \mathbb{Q}] = 8$ and each field is Galois over all its subfields with the exception that F_2 is NOT Galois over \mathbb{Q} .