

## Tutorato 6 AL310

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Mercoledì 28 novembre 2018

**Exercise 1.** Give an example of finite extension  $E/F$  with the property that  $1 < \#Aut(E/F) < [E : F]$ .

**Exercise 2.** Describe the elements of  $Aut(\mathbb{Q}(2^{\frac{1}{4}}, i)/\mathbb{Q})$  and determine their orders.

**Exercise 3.** Describe the lattice of subfields of the splitting field of the polynomial  $f(x) = x^{13} - 1 \in \mathbb{Q}[x]$ .

**Exercise 4.** Describe the lattice of subfields of the splitting field of the polynomial  $f(x) = x^{15} - 1 \in \mathbb{Q}[x]$  and for each subfield write the minimal polynomial of a generator.

**Exercise 5.** Determine the values of  $b \in \mathbb{Q}^*$  such that the extension  $\mathbb{Q}[b^{\frac{1}{6}}]/\mathbb{Q}$  is Galois.

**Exercise 6.** Describe the lattice of subfields of  $\mathbb{Q}(\zeta_{16})$ .

**Exercise 7.** Describe the lattice of subfields of  $\mathbb{Q}(\zeta_{19})$ .