

## Homework 4

Due to 6pm, March 11, 2019

**Problem 1.** (15 points) Let  $F = \mathbb{Q}(a_1, a_2, \dots, a_n)$  with  $a_i^2 \in \mathbb{Q}$ . Prove that  $\sqrt[3]{2} \notin F$ .

**Problem 2.** (15 points) Let  $F$  be a field and let  $f \in F[X]$  be a polynomial with a splitting field  $E$  over  $F$ . Show that for any element  $\alpha$  of some extension of  $F$ ,  $E(\alpha)$  is a splitting field of  $f$  over  $F(\alpha)$ .