

**MATH 6310, Homework 10**  
**Due in class 11/6**

Please continue to look over §13 and do

- §13.2, questions 14, 21
- §13.3, question 1
- §13.4, question 5
- §13.5, questions 4, 5, 7
- §13.6, question 10

and

1. (a) We showed in class that if  $K$  is a splitting field of a polynomial  $f(x) \in F(x)$  of degree  $n$ , then  $[K : F] \leq n!$ . Show that, in fact,  $[K : F]$  divides  $n!$ .
- (b) Give, for all  $n$ , explicit examples for which you can prove  $[K : F] = n!$ . (*I'm not sure how hard this is, so please feel free to skip it. Reading ahead in the Galois Theory part of the book you'll find Theorem 32 on page 609, which implies that a "general example" has  $[K : F] = n!$ .)*

Read on in §10, §11.