

ASSIGNMENT 7

DUE FRIDAY, OCTOBER 31, 2003.

Reading. Sections 5.3 and 5.4 of Herstein.

Herstein problems.

- Section 5.3, problems 6 (a) and (c), 11, and 14.

Other problems.

1. Let $F \subseteq K \subseteq E$. Suppose that both E is a splitting field for a polynomial $f(x) \in F[x]$ over F . Prove carefully that E is also a splitting field for f over K .

(This was one of the key steps in our proof that splitting fields are unique up to isomorphism; it was what allowed us to invoke the inductive hypothesis.)

2. Is it possible to construct square whose area is equal to that of a given triangle?
3. Let W be the field of constructible real numbers. Prove that W is the smallest subfield of \mathbb{R} such that for every $a \in W$, $a > 0$, we have $\sqrt{a} \in W$.