MATHEMATICS 329—RINGS AND FIELDS—NOVEMBER 26, 2003

# ASSIGNMENT 11

DUE FRIDAY, DECEMBER 12, 2003.

**Reading.** Handouts from Artin, Herstein Section 5.8.

**Herstein problems.**

Section 5.8, problems 3, 4, 5(c), and 7. (Hint for 3 and 4: one way to think about generating $S_n$ with given elements is algorithmically: given a sorted list, $1, 2, \ldots, n$, can you reach an arbitrary perumation $\pi$ using only the given generators?).

**Other problems.**

1. Let $G$ be the Galois group of an irreducible quintic polynomial. Prove that, if $G$ contains an element of order 3, then $G = S_5$ or $G = A_5$.

2. Let $K$ be a normal extension of $F$ of degree 10. Is every element of $K$ expressible by radicals?