Last name _____

First name _____

LARSON—MATH 610—CLASSROOM WORKSHEET 28
Polynomials, Ideals, Determinants.

Concepts & Notation

- (Sec. 4.1) *linear algebra*, $\mathbb{F}^\infty$, *algebra of formal power series*.
- (Sec. 4.2) $\mathbb{F}[x]$, *degree*, *scalar* polynomial, *monic* polynomial.
- (Sec. 4.4) *polynomial ideal*.
- (Sec. 5.1) *n-linear* function, *alternating function*, *determinant function*, $\det A$.

Review

1. If $p \in \mathbb{F}[x]$ and α is an element of a linear algebra, what is $p(\alpha)$?

2. What is the difference between a *polynomial* and a *polynomial function*?

New

3. What is a *root* of a polynomial?

4. What is an *ideal* in $\mathbb{F}[x]$? What is a *principle ideal*?

5. (**Claim:**) Every ideal in $\mathbb{F}[x]$ is *principle*.

6. What is an *n-linear* function?

7. What is an *alternating* function?

8. What is a *determinant* function?

Let A be an $n \times n$ matrix over a *commutative ring*. Let:

$$\det A = \sum_{\sigma \in S_n} (sgn\ \sigma) \prod_{i=1}^{n} A_{i,\sigma(i))}.$$

9. What is "σ", what is S_n and how does this definition work?