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LARSON—MATH 610—CLASSROOM WORKSHEET 26
Polynomials.

Concepts & Notation

- (Sec. 3.5) *linear functional, trace, dual space, V^* , dual basis, annihilator.*
- (Sec. 4.1) *linear algebra, \mathbb{F}^∞ , algebra of formal power series.*
- (Sec. 4.2) $\mathbb{F}[x]$, *degree, scalar polynomial, monic polynomial.*

Review

1. What is \mathbb{F}^∞ ? Let $f, g \in \mathbb{F}^\infty$. How is fg defined?
2. What is $1 \in \mathbb{F}^\infty$?
3. What is $x \in \mathbb{F}^\infty$?
4. What is $x^2 \in \mathbb{F}^\infty$?
5. What is $\mathbb{F}[x]$?

New

6. What is the *degree* of $f \in \mathbb{F}[x]$?
7. What is a *scalar* polynomial?
8. What is a *monic* polynomial?

9. (**Claim:**) If f and g are non-zero polynomials over a field \mathbb{F} then:

- (a) fg is a non-zero polynomial;
- (b) $\deg(fg) = \deg(f) + \deg(g)$;
- (c) fg is a monic polynomial if and only if both f and g are monic polynomials;
- (d) fg is a scalar polynomial if and only if both f and g are scalar polynomials;
- (e) if $f + g \neq 0$ then $\deg(f + g) \leq \max\{\deg(f), \deg(g)\}$.

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

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

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