

Algebra Qual Prep: Summer, 2008.

Ring Theory

August 11, 2008

1. Structure theory
 - (a) Ideals: prime, maximal ($\text{Spec}(R)$)
 - (b) Automorphisms, homomorphisms
 - (c) Chinese Remainder Theorem
 - (d) Localization
 - (e) Nil, Nilpotent rings
 - (f) Jacobson Radical
 - (g) Tensor Product/Extension of scalars
 - (h) Noetherian rings
 - i. Nullstellensatz
 - ii. Hilbert basis theorem
 - iii. Artin-Tate theorem
 - (i) Simple, central-simple rings
2. Types of Rings
 - (a) Factor rings
 - (b) Algebras
 - (c) Integral domains
 - (d) $\text{ED} \implies \text{PID} \implies \text{UFD}$
 - (e) Division Rings
3. Examples
 - (a) Polynomial rings
 - (b) Matrices
 - (c) Power series, Laurent series