Exam III
Review

On this review sheet there are 16 definitions listed. You will be asked to state 5 of the 16 listed definitions (15% of the exam).

On this review sheet there are 4 theorems (some of which have multiple parts) listed with an indication that you should know how to prove them. You will be asked to prove one part of one of the 4 listed theorems (15% of the exam).

On this review sheet there is a reference to providing Examples of Rings, Integral Domains and Fields. 1 of the problems on the exam will ask you to provide Examples of Rings, Integral Domains and Fields with specified conditions, which are <u>different</u> from the specific examples listed in Figure 1 page 207 (10% of the exam).

Section	Topics	Listed Definitions / Exam Prototype Problems
2.2	Definition of a group homomorphism Definition of the kernel of a homorphism Prop. 2.2.15 Basic homomorphisms properties Prop. 2.2.16 & 2.2.17 (<u>Proofs</u>) Definition of an isomorphism Conditions to verify groups are isomorphic Prop. 2.2.23 Consequences of isomorphism	Definitions 2.2.2, 2.2.11, 2.2.18 Problems, Page 80 2, 8, 20, 24, 25, 26, 35, 41
2.3	Definition of a normal subgroup Prop. 2.3.3/2.3.5 Theorem 2.3.10	Definitions 2.3.4 Problems, Page 92 1, 3, 4, 13
2.4	Theorem 2.4.3 Group of cosets Definition 2.4.4 Quotient Group Prop. 2.4.9 Inherited Properties of Quotient Group Theorem 2.4.15 First Isomorphism Theorem Prop. 2.4.18 Theorem 2.4.19 Commutative Diagrams Cauchy's Theorem for Abelian Groups	Definitions 2.4.4 Problems, Page 100 1-4, 7-9, 13
3.1	Theorem 3.1.4 Product Group Definition 3.1.5 Direct Product Group Proposition 3.1.8	
3.2	Theorem 3.2.3 Order of an element of a direct product group Theorem 3.2.8 $\mathbb{Z}_n \times \mathbb{Z}_m$	

Section	Topics	Listed Definitions / Exam Prototype Problems
6.1	Definition of a ring Prop. 6.1.8 Multiplication Facts for Rings (Proofs) Definition 6.1.9 Definition of subring Theorem 6.1.13 Conditions to be a subring	Definitions 6.1.2, 6.1.9, 6.1.12 Problems, Page 197 1-6, 11, 13, 15
6.2	Definition of a zero divisor Theorem 6.2.4 Zero divisors in $\mathbb{Z}_n$ Corollary 6.2.5 $\mathbb{Z}_p$ Cancellation Laws Theorem 6.2.7 Equivalence of Cancellation Laws and Non-existence of Zero Divisors (Proofs) Definition of Integral Domain Definition of subdomain Prop. 6.2.11 Conditions to be a subdomain	Definitions 6.2.2, 6.2.8, 6.2.10 Problems, Page 201 1-7, 8, 9, 13, 14, 16
6.3	Definition of unit Theorem 6.3.5 Theorem 6.3.6 Definition of a field Theorem 6.3.14 Every finite integral domain is a field Coro. 6.3.15 Definition of a subfield Prop. 6.3.17 Conditions to be a subfield Definition of a division ring Definition of the characteristic of a ring	Definitions 6.3.3, 6.3.11, 6.3.16, 6.3.21, 6.3.24 Problems, Page 208 1-8, 16-22, 23, 24-26 Examples of rings, integral domains, fields (see Figure 1 page 207)