

P.M. Cohn

Introduction to Ring Theory



Springer

Contents

Introduction	1
Remarks on Notation and Terminology	3
Chapter 1 Basics	7
1.1 The Definitions	7
1.2 Fields and Vector Spaces	16
1.3 Matrices	27
1.4 Modules	31
1.5 The Language of Categories	43
Chapter 2 Linear Algebras and Artinian Rings	53
2.1 Linear Algebras	53
2.2 Chain Conditions	59
2.3 Artinian Rings: the Semisimple Case	66
2.4 Artinian Rings: the Radical	75
2.5 The Krull-Schmidt Theorem	80
2.6 Group Representations, Definitions and General Properties	84
2.7 Group Characters	94
Chapter 3 Noetherian Rings	103
3.1 Polynomial Rings	103
3.2 The Euclidean Algorithm	109
3.3 Factorization	115
3.4 Principal Ideal Domains	120

3.5	Modules over Principal Ideal Domains.....	125
3.6	Algebraic Integers.....	130
Chapter 4	Ring Constructions.....	135
4.1	The Direct Product of Rings.....	135
4.2	The Axiom of Choice and Zorn's Lemma.....	140
4.3	Tensor Products of Modules and Algebras.....	143
4.4	Modules over General Rings.....	150
4.5	Projective Modules.....	156
4.6	Injective Modules.....	163
4.7	Invariant Basis Number and Projective-Free Rings.....	169
Chapter 5	General Rings.....	175
5.1	Rings of Fractions.....	175
5.2	Skew Polynomial Rings.....	181
5.3	Free Algebras and Tensor Rings.....	188
5.4	Free Ideal Rings.....	197
	Outline Solutions.....	203
	Notations and Symbols.....	219
	Bibliography.....	223
	Index.....	225