Exam IV
Review

The final exam (Wednesday, 15 December, 1:30, Math 012) will consist of

Review Exam I, Review Exam II, Review Exam III	60%
Review Exam IV	40%

You may bring one sheet of paper with notes for reference to the exam.

Section	Topics	Listed Definitions / Exam Prototype Problems
7.1	Definition of a ring homomorphishm Definition of the kernel of a ring homomorphism Proposition 7.1.8 Properties of a ring homomorphism Proposition 7.1.9 Properties of a ring homomorphism Definition of a ring isomorphism Proposition 7.1.11 Properties of ring isomorphisms	Definitions 7.1.3, 7.1.7, 7.1.10 Problems, Page 214 1-6, 18
7.2	Proposition 7.2.2 Definition of an ideal Definition of principal ideal generated by a Proposition 7.2.11 Theorem 7.2.14 Quotient Ring Theorem 7.2.17 First Isomorphism Theorem for Rings Definition of prime ideal Definition of a maximal ideal Theorem 7.2.27 Characterization of ideals via quotient rings Corollary 7.2.28	Definitions 7.2.3, 7.2.8, 7.2.22, 7.2.23 Problems, Page 222 1-9, 11-12, 16, 22,
8.1	Definition 8.1.3 Definition 8.1.4 Definition 8.1.6 Definition 8.1.7 Theorem 8.1.12 Given a ring R, properties of $R[x]$	Definitions 8.1.3 Problems, Page 237 1-6, 7-8, 10-14, 21-22
8.2	Theorem 8.2.2 Division Algorithm Definition 8.2.4 Definition 8.2.6 Theorem 8.2.8 Existence of gcd($f(x),g(x)$) as linear combination of $f(x)$ and $g(x)$ Theorem 8.2.9 Euclidean Algorithm	Problems, Page 244 1-5, 6-8, 11-12,15-17

Section	Topics	Listed Definitions / Exam Prototype Problems
8.3	Theorem 8.3.2 Factor Theorem (<u>Proof</u>) Theorem 8.3.4 Remainder Theorem (<u>Proof</u>) Definition of multiplicity of a root Theorem 8.3.7 Theorem 8.3.11	Problems, Page 248 1-7, 13, 14, 16-20
8.4	Definition of irreducible Theorem 8.4.5 Euclid's Lemma (<u>Proof</u>) Theorem 8.4.6 Unique Factorization Theorem Theorem 8.4.7 Proposition If $f(x)$ has a root in R, then $f(x)$ is reducible over R Theorem 8.4.11 Rational Roots Theorem	Definitions 8.4.1 Problems, Page 258 1-8, 9-12, 13-15