MATERIAL TO STUDY FOR MATH 784

I have tried to list below the main topics covered in the course. If a topic is not to be included as part of the comprehensive exam, I have written "omit" next to the topic. If I expect you to know the proof(s) associated with a given topic, I have written "proofs" next to the topic.

(1) Algebraic integers
(2) The elementary symmetric functions
(3) Algebraic number fields and rings of integers
(4) The ring of integers in $\mathbb{Q}(\sqrt{m})$
(5) Partial quotients and convergents of simple continued fractions
(6) Good approximations by rationals (proofs of Theorems 21 and 22)
(7) Hurwitz' Theorem and the Thué-Siegel-Roth Theorem
(8) Simple continued fractions for quadratic irrationals
(9) Units in the ring of integers in $\mathbb{Q}(\sqrt{m})$
(10) The elements of $\mathbb{Q}(\alpha)$ (proof of Theorem 35)
(11) Field conjugates, norms, and traces (computations)
(12) The discriminant (computations)
(13) Integral bases
(14) The field $\mathbb{Q}(\zeta_n)$ (omit)
(15) Irreducibles and primes
(16) Euclidean domains, PID's, and UFD's
(17) More on Quadratic Extensions (proofs of Theorems 56 and 58)
(18) Some applications, Theorems 60, 61, 62, 64 (omit)
(19) More applications, Theorems 59, 63
(20) Ideal theory, Theorems 65, 66, 68 (proofs)
(21) Unique factorization of ideals
(22) Modular arithmetic with ideals
(23) Prime ideals, Theorem 80 (proofs)
(24) Application to irreducibility (omit)
(25) Fractional ideals