DISCRETE MATHEMATICS
Math 245
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Suggestions for preparing for the Second Exam

I. Properties of the integers and rational numbers:

- Be able to use (and recognize that you are using) commutativity, associativity, the additive and multiplicative identity, the additive inverse (and, for the rationals, the multiplicative inverse), distributivity.

- Properties of $<$.

- Definitions of prime, composite, divides, floor, ceiling.

II. Know the statements of the following theorems, and how to use the theorems.

- Quotient-remainder theorem.

- For a prime p and integers a and b, if p divides ab then p divides a or p divides b.

- The unique factorization theorem.

III. Know how to prove the classics:

- There exist an infinite number of primes.

- $\sqrt{2}$ is irrational.

- The sum of a rational number and an irrational number is irrational.

IV. Be able to prove fundamental results (or give counterexamples).

- §3.3: Theorem 3.3.1, exercises 15, 16, 21-26.

- §3.5 exercises 18-24.

- §3.6 exercises 9-11, 21, 22.

- §3.7 exercises 8-12, 23, 24.