

DISCRETE MATHEMATICS

Math 245

Michael E. O'Sullivan

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.