

Final Study Guide

Below is a list of group exercises you should know how to do for the final exam. The date/topic is provided to guide you to the slide deck where you can find those group exercises as well as their solutions.

The final exam will be a subset of these group exercises. (The final will probably about 8-10 exercises. Likely each module will be covered by at least one question.)

You will be provided with key definitions (e. g. prime, composite, divisible, independent) and theorems (e. g. for solving recurrence relations).

MODULE 1: Introduction to mathematical thinking

Fri	Jan 17	Theorem	Ex. 1, 2, 3
Wed	Jan 22	Proof	Ex. 1, 3
Fri	Jan 24	Counterexample	Ex. 1, 2, 4
Mon	Jan 27	Boolean Algebra	Ex. 1, 2b, 2c
Mon	Feb 3	More Induction	Ex. 1, 2

MODULE 2: Discrete Collections

Wed	Feb 5	Lists	Ex. 1, 2, 3
Fri	Feb 7	Factorial	Ex. 1, 2
Mon	Feb 10	Sets	Ex. 1a, 1b, 1c, 1f, 2
Wed	Feb 12	Quantifiers	Ex. 2, 3
Fri	Feb 14	Operations on Sets	Ex. 1,2,3

MODULE 3: Relations and functions

Wed	Feb 19	Intro to Relations and Functions	Ex. 2
Fri	Feb 21	Intro to Relations and Functions (continued)	Ex. 1,2
Mon	Feb 24	Relations	Ex. 1,2,3,4,5 (for #5, skip anti-symmetric and anti-reflexive)
Wed	Feb 26	Equivalence Relations	Ex. 1,2,3
Fri	Feb 28	Partitions	Ex. 1,2,3
Mon	Mar 3	Functions	Ex. 1,2,3

MODULE 4: Counting

Wed	Mar 5	Binomial Coefficients (Combinations)	Ex. 1,2,3,4
Mon	Mar 10	Inclusion-Exclusion	Ex. 2

MODULE 5: Discrete probability

Wed	Mar 12	Intro to Probability (Part 1)	Ex. 1,2,3
Mon	Mar 24	Intro to Probability (Part 2)	Ex. 1,3

Wed	Mar 26	Conditional Probability /Independence	Ex. 1,2,4
Fri	Mar 28	Random variables	Ex. 1,3
Mon	Mar 31	Expectation	Ex. 2,3

MODULE 6: Recurrence and computational complexity

Wed	Apr 2	Recurrence	Ex. 1,2
Fri	Apr 4	Big O Notation	Ex. 1,2,3,4

MODULE 7: Graph theory

Wed	Apr 9	Fundamentals of Graph Theory	Ex. 1,2,3,4,5,6
Fri	Apr 11	Subgraphs	Ex. 3
Mon	Apr 14	Connection	Ex. 1, 3