

Math 216 Algebraic Structures, Spring 2002

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Lecture notes, exercises and exams: <http://www2.bc.edu/~reederma/>

LECTURE NOTES table of contents

0. BASICS

Logical notation, Sets, Various kinds of numbers, Integers, Induction, Binomial Coefficients.

I. THE INFINITUDE OF PRIMES (related to Book, chapter 1)

1. Euclid's proof, and variations
2. Fermat numbers
3. Equivalence relations, groups and Lagrange's theorem
4. Mersenne numbers
5. Fermat numbers again
6. Review of infinite series
7. Big and small sets of positive integers
8. Euler's view of the infinitude of primes
9. The growth of primes
10. Some famous unsolved problems

II. THE ZETA FUNCTION (related to Book, chapter 6)

11. Product formula for the zeta function
12. Values of the zeta function
13. A formula for π
14. $\zeta(s)$ as volume
15. Density of the square-free numbers

III. IRRATIONAL NUMBERS (related to Book, chapter 6)

16. A taxonomy of Numbers
17. The number e
18. The number π

IV. FUNCTIONS (related to Book, chapter 15)

19. Injections, Surjections, Bijections
20. Permutations
21. General functions
22. Countable Sets
23. Uncountable Sets
24. The Cantor set

V. GRAPH THEORY (related to Book, chapter 10)

25. Basic ideas about graphs
26. Isomorphisms and Automorphisms
27. Trees
28. Euler's formula