Review for Final Exam - Math 100, Spring 2005
Part A - General

Where and when: March 13, usual classroom, 2:15-4:15 - try to get there 5 minutes early

What you need: Pencil or pencils, Student ID. You will not be permitted to use a calculator or have anything else on your desk besides the exam, solution sheet, pencils, and your ID. Bring your ID, the ID is required. If you don't have your student ID, bring another photo ID and your ID number. The ID number is required. On a related subject: bring your ID.

Form: Multiple choice, 30-40 problems (plus 6 extra credit - see below)

Coverage:

Gemignani: Chapters 1-5, 6.1-6.4, 12

Stein: Chapters 2-4, 9, 13, 16, 18, 19

Gonick/Smith: Chapters 1-7.

Stewart (optional but strongly recommended): Chapter2, 3(through p32),5, 6(through p75), 11, 13, 17

Breakdown: (Approximate)

New Material: (Infinite Sets, Probability and Statistics): approximately 15 problems

Old Material: approximately 15 problems

Course Overview: approximately 5 problems

Extra Credit: There will be 6 extra credit problems, 4 drawn from T.C.MITS and 2 from Stein Ch. 19. These will be easy questions to answer for anyone who read this material, difficult for anyone who did not. There will also be a disincentive for guessing wildly. These problems can add up to 25 points to the semester's numerical total (of 450).

Details

New Material:

Infinite sets: (6-7 problems?) Some things you will be expected to know/do: definition of "have the same cardinality" (or "conumerous"), also what is the difference between that and "cardinality"; definitions of "countable" and "uncountable" and "cardinality of the continuum"; ability to identify where certain known sets fit into the hierarchy of infinities. be able to recognize a proof that two sets have the same cardinality. What is Cantor's diagonal argument? What is the Continuum Hypothesis?

Probability and statistics: (8-9 problems?) Data description, including stem-leaf plots, boxplots, and summary statistics. Probability concepts like sample space, probability measure, event. Properties of probability; independence. Computing some simple probabilities. Concepts of random variable, probability distribution function, probability density function. Normal distribution. Expected value (or mean) and variance of a random variable. Normal distribution. Central limit theorem. Confidence interval.

Old Material: See also the review sheets for the earlier exams. You will be examined on both skills and concepts; I am going to try for a mix of each

Proof: Types of proof; components of proof; identifying correct proofs. Direct proof, proof by contradiction. Deduction vs. Induction.

Number systems: What they are, why we move to larger ones, what are the properties of each. Von Neumann numbers. peano Postulates. Decimal expansions of real numbers. Operations on Complex numbers. Polynomial equations.

Number theory: Prime numbers, GCD, LCM, Euclidean algorithm, Prime Number Theorem, Fundamental Theorem of Arithmetic.

Logic: Well-formed formulae, truth tables, equivalence, tautologies, converse vs. contrapositive, deduction rules. Quantifiers ($\forall$ and $\exists$) in predicate logic. Translating between logic (both propositional or predicate) and English. Why do we formalize logic?

Sets: Basic definitions and operations. Is there a set of all sets? Venn diagrams. Relations to predicate logic. Using sets for representing/checking deductions.