

MA 330, Spring 2009 Possible Course Project Topics

Below is a list of possible course project topics. You are *not* restricted to completing a project from this list. For each topic, I have listed a theorem and a person who was heavily involved that might be of interest for biographical reasons. You might notice that many of these come from the website “The Hundred Greatest Theorems,” linked to from the course website, but many do not.

- (1) The Erdős-Ko-Rado Theorem, Erdős (combinatorics)
- (2) Galois’ Theorem regarding solvability of polynomials by radicals, Galois (classical algebra)
- (3) Abel’s Theorem regarding the unsolvability of the quintic by radicals, Abel (classical algebra)
- (4) Prime Number Theorem, Hadamard (number theory)
- (5) Quadratic Reciprocity, Gauss (number theory)
- (6) Hilbert’s Third Problem, Hilbert and Dehn (geometry)
- (7) Brouwer Fixed Point Theorem, Brouwer (topology)
- (8) The Cayley-Hamilton Theorem, Cayley (matrix algebra)
- (9) Lagrange’s Theorem for finite subgroups of a finite group, Lagrange (abstract algebra)
- (10) Stirlings Formula, Stirling (analysis)
- (11) Irrationality of π , Niven (gave a now common proof) (analysis)
- (12) Hyperbolic Geometry, Poincarè (geometry)
- (13) Partition Identities, Ramanujan (combinatorics, number theory)
- (14) Noether’s Theorems, E. Noether (abstract algebra)
- (15) Green’s Theorem, Green (multivariable calculus)
- (16) Fourier Series, Fourier (calculus)
- (17) Calculating Machines, Pascal & Leibnitz & Babbage (computer science)
- (18) Infinite Series, Maclaurin & Taylor (calculus)
- (19) Partial Differential Equations, d’Alembert (calculus)
- (20) How to count votes fairly, de Borda & Condorcet (mathematical economics)
- (21) Five Color Theorem, Kempe & Heawood (combinatorics)
- (22) Cayley’s Tree Theorem, Cayley & Plücker (combinatorics)
- (23) Catalan Numbers, Catalan (combinatorics)
- (24) Transcendental nature of e , Hermite (analysis)