

MATH 310 Elementary Number Theory

Prerequisites

MATH 227 with grade of C or better.

Bulletin Description

Divisibility, congruences, power residues, quadratic reciprocity, diophantine equations. Number theoretic functions, continued fractions and rational approximation, partitions.

Course Objectives

Students will learn of the role of number theory in the history of mathematics. Students will learn how to do number-theoretic proofs. Included among specific items they will be required to know are the following:

1. Finding the greatest common divisor and least common multiple of a pair of natural numbers, and finding the linear form of the greatest common divisor.
2. Prime factorization;
3. Solving linear congruences and systems of simultaneous linear congruences;
4. The theorems of Fermat, Wilson, and Euler;
5. Primitive roots modulo primes and prime powers;
6. Determining whether a quadratic congruence has solutions, and if so, finding them.

Evaluation of Students

Students will be graded on the basis of their performance on mid-term and final exams, plus presentation of solutions to assigned exercises in class. Each exam will include a proof.

Course Outline

Topic	Weeks
Binomial coefficients; induction	1
Divisibility & Primes	3
Congruences	4
Number-theoretic functions	2
Primitive roots	2
Quadratic congruences	3

Textbooks and Software

Beginning Number Theory (2nd ed.) by Neville Robbins (2006) Bartlett & Jones

Submitted by: Neville Robbins Date: Sept. 26, 2006