

Learning Outcomes for Number Theory, MATH-47011

Knowledge

The students should be able to define the main concepts related to primality, divisibility, congruences, and number-theoretic functions. The students should be able to formulate main results proved in the course, in particular, the Euclidean Algorithm, Euclid's Lemma, the Chinese Remainder Theorem, Fermat's Little Theorem, Euler's Theorem, and the Quadratic Reciprocity Law.

Comprehension

The students should have a good understanding of the proofs of the main theorems. Should be able to argue by induction and by contradiction. Should be comfortable with divisibility proofs that use a number of different means, including induction, congruences, and divisibility tests.

Application

Solve many different problems related to the material covered. Understand how Number Theory plays an important role in Cryptography.

Analysis

Use examples to make conjectures about general situations; Break complicated problems into small parts and relate them to the results proved in the course.

Synthesis

The course introduces a rigorous framework for notions and constructions that students were familiar with at the intuitive level since Middle school.

Evaluation

Be able to decide how to approach a particular problem or example in the course, based on the previous experience and knowledge. Understand that a problem may have a few correct solutions.

Class Activities

Solve problems, prove theorems, apply theorems and other results to concrete examples.

Out of class Activities

Work on weekly homework assignments.