Claremont McKenna College, Spring 2024
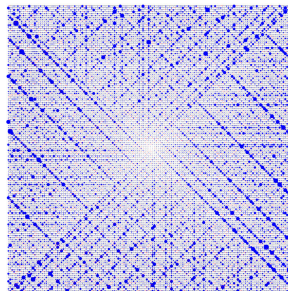## MATH 175: Number Theory

Instructor: Lenny Fukshansky, Adams Hall 218, (909) 607 - 0014, lenny@cmc.edu
Time: Tuesdays and Thursdays, 2:45 – 4:00 pm

Prerequisite: MATH 60 or instructor's consent. I am happy to talk to anybody interested in this course, and in particular to discuss if their background is sufficient.

Text (required): "Number Theory" by George E. Andrews, Dover Publications, 1994. Additional notes and materials may be provided as needed.

Course Description: Number Theory is a beautiful subject with ancient history, which was one of the original areas of mathematics and has always played a central role in it. Legendary mathematicians such as *Fermat*, *Euler*, *Gauss*, *Riemann*, *Dirichlet*, and many others have actively worked in Number Theory and greatly contributed to its development. It has been especially in the spotlight in the recent years in connection with the proofs of *Fermat's Last Theorem*, work on the *Riemann Hypothesis* and distribution of prime numbers, *ABC Conjecture* and many other important advances. In 2000, the influential Clay Mathematical Institute compiled a list of seven "*Millennium Problems*", deemed the most important open problems in all of mathematical sciences: two of these, worth a million dollars each, are in Number Theory. One striking feature of Number Theory is that many of its most deep and fundamental problems are actually very easy to state, which allows appreciation of its beauty even with a limited mathematical background.

The goal of the present course is to introduce the subject and some of its methods. The topics covered will include the fundamental theorem of arithmetic, Euclid's algorithm, congruences, Diophantine problems, quadratic reciprocity, arithmetic functions, and distribution of primes. If time allows, we may also discuss some geometric methods, coming from lattice point counting, such as Gauss's circle problem and Dirichlet divisor problem, as well as some connections of number theory to computer science, coding theory, cryptography, and computational complexity theory.

Grading: Based on regular homework assignments, a midterm, and a final.

Registration is open to all 7C students -- I am happy to talk to anyone interested in this course!