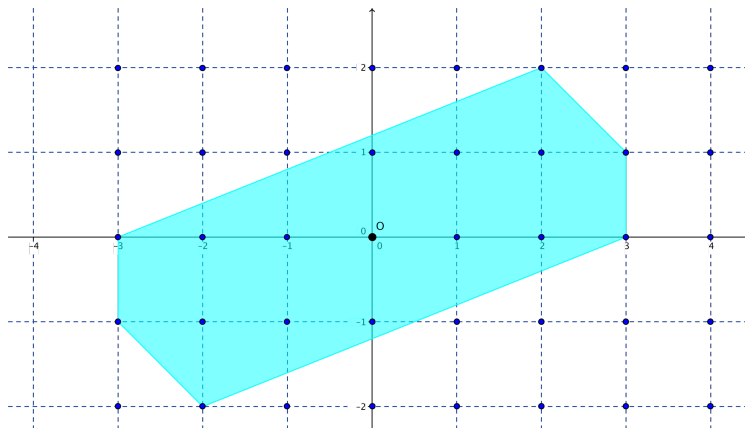# Claremont McKenna College, Spring 2019
MATH 195: Geometric Number Theory

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

Prerequisites: MATH 171 (Abstract Algebra I). I am happy to talk to anybody interested in this course, and in particular to discuss if their background is sufficient.

Text: There is no textbook required. Typed lecture notes will be provided by the instructor.

Course Description: Number Theory, the study of Arithmetic is surprisingly full of geometric ideas. Hermann Minkowski (1864 – 1909) was among the first to fully realize it, as evidenced by his discovery of the amazingly powerful Geometry of Numbers, a branch of mathematics that studies the interplay of convex bodies and integer vectors in Euclidean spaces. Motivated by some classical discrete optimization problems, like sphere packing and covering, dating back to the work of Johannes Kepler (1571 – 1630), geometry of numbers found remarkable applications in modern mathematics, ranging from algebraic number theory to functional analysis. The goal of this course is to introduce geometric ideas underlining some classical arithmetic results. It turns out that many completely algebraic or arithmetic questions can be reformulated into this geometric framework. In this course, we will introduce Minkowski's fundamental theorems and discuss some of their far-reaching applications and connections. Possible topics to be covered include lattices and quadratic forms, Minkowski's geometry of numbers, applications of geometry of numbers to Diophantine approximation and transcendence, Lagrange's four squares theorem, Minkowski-Hlawka theorem, finiteness of class number, and other related topics as time allows.

Registration is open to students from all of the Claremont Colleges, and I will be happy to talk to anyone interested in this course!