

SET 8

- (1) Find the number of 2005-digit numbers which contain only the digits 1 through 9, which contain each digit at least once, and which contains no pair of identical consecutive digits.
- (2) Show that 4 cannot be written as the sum of three (positive or negative) cubes of integers.
- (3) A 2-player game begins with a 5×5 square. On each turn, one player takes one rectangle and breaks it into two rectangular pieces with integer side lengths (e.g., the first player might begin by breaking the square into a 2×5 and a 3×5 piece. The game ends when all the pieces are 1×1 ; the last player to move wins. Assuming both players play optimally, who should win?