

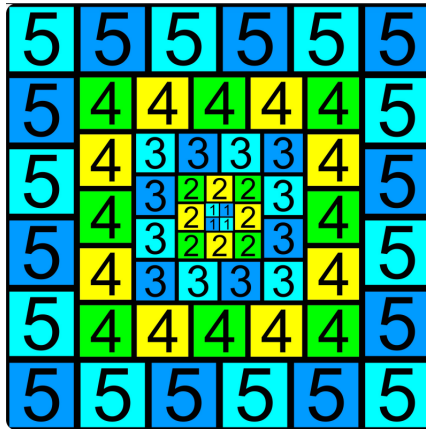
Due Wednesday, September 8 at the beginning of class. All chapter and exercise numbers refer to Siverman's *A Friendly Introduction to Number Theory*, 4th edition.

- (1) Use induction to prove the sum of the first n natural numbers is given by

$$1 + 2 + \dots + n = \frac{n(n + 1)}{2}$$

(see chapter 1 for a geometric argument).

- (2) Use the following diagram to conjecture a formula for the sum of the cubes of the first n natural numbers. (The number in each square refers to the side length.)



Then use induction to prove your formula is correct.

- (3) Prove that $n^2 - n$ is divisible by 2, $n^3 - n$ is divisible by 6, and $n^5 - n$ is divisible by 30 for any natural number n .
- (4) Ex. 2.6
- (5) Ex. 3.3
- (6) Ex. 3.4
- (7) Ex. 3.5(a)-(d)
- (8) Ex. 5.3
- (9) Ex. 5.4