

## MA310 – Homework #5

Due Tuesday, March 24

- By Tuesday, March 10, carefully read Chapters 5 and 14 of the textbook.
1. Quadratic Patterns of Change handout, problem 51 on page 53. Let  $s_n$  be the number of squares in an  $n \times n$  grid.
    - (a) Find a formula for the current term,  $s_n$ , in terms of the previous term,  $s_{n-1}$ .
    - (b) Find a formula for  $s_n$  directly in terms of  $n$ . (This should not be expressed in the form of a sum of  $n$  terms.) Check your formula using your calculator.
  2. Textbook, #7 on page 127. Don't forget to provide an explanation!
  3. A large  $n \times n \times n$  cube is made by stacking up  $n^3$  unit white cubes. Then the large cube is painted red. For each of the following questions, explain from the geometry of the problem exactly where the formulas come from and why they make sense.
    - (a) How many of the unit cubes end up with red paint on exactly three of their faces?
    - (b) How many of the unit cubes end up with red paint on exactly two of their faces?
    - (c) How many of the unit cubes end up with red paint on exactly one of their faces?
    - (d) How many of the unit cubes end up with red paint on none of their faces?
  4. Textbook, #1acgh on page 381.
  5. Textbook, #6 on page 382.