# HOMEWORK ASSIGNMENT NO. 1

Your assignment should include complete sentences and explanations and not just a few equations or numbers. A solution will not receive full credit unless you explain what your answer represents and where it came from. You may discuss the homework with other students in the class, but please write your own solutions.

(1) Complete the self test of the academic integrity tutorial found online at
    http://www.yorku.ca/tutorial/academic_integrity/
    Print out the results and include it with this assignment.
(2) Explain in words why the number of boxes in the diagram
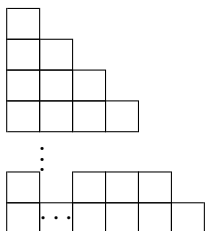
   is represented by the sum $1 + 2 + \cdots + n$. Explain how two of these diagrams can be placed together to create a diagram with $n(n + 1)$ boxes. (Note: your description must explain why the picture contains $n(n + 1)$ boxes).
(3) Explain in words why the diagram
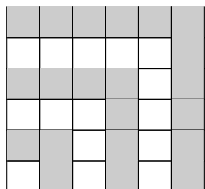
   shows that $1 + 3 + 5 + 7 + 9 + 11 = 36$ and extend this description in words to explain why more generally we have

$$1 + 3 + 5 + \cdots + (2n - 1) = n^2 \ .$$

(4) Read the excerpt from Krantz *Techniques of problem solving*. Use a similar argument to show that since $n^2 - (n - 1)^2 = 2n - 1$, $1 + 3 + 5 + \cdots + (2n - 1) = n^2$.
(5) Using this same technique, find and provide an explanation for a formula for the sum $1^2 + 2^2 + \cdots + n^2$.