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.
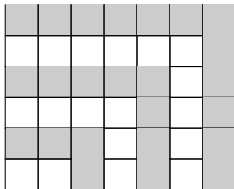(2) Explain in words why the diagram
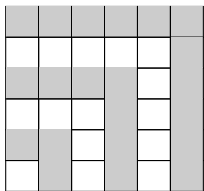
shows that $1 + 3 + 5 + 7 + 9 + 11 = 36$ and extend this description in words to explain why more generally we have

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

You should carefully explain the relationship between the terms that appear in the sum and the diagram.
(3) Explain in words why the diagram

shows that $2 + 4 + 6 + 8 + 10 + 12 = 42$ and extend this description in words to explain why more generally we have

$$1 + 2 + \cdots + n = n(n + 1)/2 .$$

(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) What is $(n+1)n - n(n-1)$? Use this expression to show that $2 + 4 + 6 + \cdots + 2n = n(n+1)$.
(6) Using this same technique, provide an explanation for the sum

$$1^2 + 2^2 + \cdots + n^2 = \frac{n(n + 1)(2n + 1)}{6}.$$