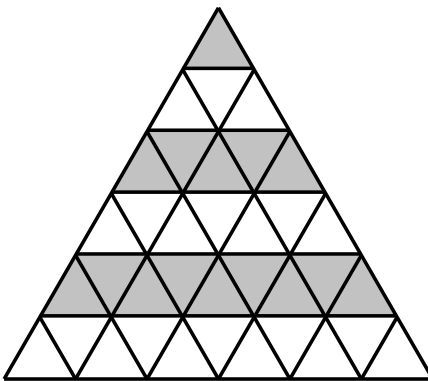


HOMWORK ASSIGNMENT NO. 1

DATE: ASSIGNED SEPT 17, 2012 - DUE OCT 1, 2012

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 (note: the site says that it will take 30-40 minutes) found online at http://www.yorku.ca/tutorial/academic_integrity/
Print out the results and include it with this assignment.
- (2) The figure below is supposed to represent a much larger figure made of up triangles where the base of each of the small triangles is of unit length. The figure below is 6 units on a side, but imagine that it is one of a sequence of figures where the n^{th} figure has length n units on a side.



- (a) How many triangles can be found in the r^{th} row from the top where $1 \leq r \leq n$?
 - (b) What is the area of the large triangle? What is the area of the large triangle divided by the small triangle?
 - (c) Use the general figure to argue that
$$1 + 3 + 5 + \cdots + 2n - 1 = n^2 .$$
- (3) Read the excerpt from Krantz *Techniques of problem solving*. Use a similar argument to show that since $n^2 - (n - 1)^2 = 2n - 1$, $1 + 3 + 5 + \cdots + (2n - 1) = n^2$.
 - (4) Using this same technique, provide an explanation for the sum

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