Math 475 Homework 7 DUE APRIL 15TH, 2009

1. Find a quadratic function that models this data:

IN	OUT
0	-6
1	-1
2	-6
3	-21
4	-46
5	-81

- 2. Prove that the first difference of an Nth degree polynomial has at most degree N 1.
- 3. Prove an *N*th degree polynomial has constant *N*th differences. (Hint: use the last answer.)
- 4. The *n*th tetrahedral number is the sum of the first *n* triangular numbers. (It's also the balls in first *n* layers of a tetrahedral ball pyramid.) Find a closed formula for it using our analysis of functions and their first, second, third, etc. differences.
- 5. Write me a formula for sums of cubes using our difference table analysis.
- 6. Derive our class solution for $x^2 + Bx + C = 0$, then explain how you can solve ANY quadratic equation using this special case and derive the Quadratic Formula.