CMSC351 Homework 4 Due: Wed, October 9, 2013

Name & Section Number: _____

1. Consider the following recurrence where n is a power of 2 and $T(1) = 7$.

$$T(n) = 5T(n/2) + 2n - 1$$

(a) What is $T(4)$. Show your work.

(b) Use the iteration method to solve the recurrence exactly. Show your work.

(c) Solve the same recurrence using the "Master Theorem". Show your work.

2. Consider the following recurrence where n is even and $T(0) = 5$.

$$T(n) = T(n-2) + 3n^2 + 1$$

(a) What is $T(6)$. Show your work.

(b) Use the iteration method to solve the following recurrence exactly. Show your work.

3. Bubble Sort can be thought of as a recursive algorithm as follows: Bubble the largest element to the bottom of the list (to be sorted). Recursively sort the remaining elements.

   (a) Write down the recursive version of Bubble Sort in psuedocode.

   (b) Derive a recurrence for the exact number of comparisons the algorithm uses.

   (c) Solve the recurrence (any way you like). Simplify as much as possible.