COMP 3270 Introduction to Algorithms

Homework 2

1. (20pts) Compare the following pairs of functions in terms of order of magnitude. In each case, say whether $f(n) = O(g(n)), f(n) = \Theta(g(n))$, or $f(n) = \Omega(g(n))$.

	$f(n)$	$g(n)$	
a.	$100n + log\, n$	$n + (log\, n)^2$	
b.	$log\, n$	$log(n^2)$	
c.	$\frac{n^2}{log\, n}$	$n(log\, n)^2$	
d.	$n^{\frac{1}{2}}$	$log\, n^5$	
e.	$n2^n$	3^n	

2. (30 pts) Use the Master Method to solve the following three recurrence relations and state the complexity orders of the corresponding recursive algorithms.

(a) $T(n) = 2T(99n/100) + 100n$

(b) $T(n) = 16T(n/2) + n^3 lgn$

(c) $T(n) = 16T(n/4) + n^2$

3. (50 pts) Use the Substitution Method to solve the following recurrence relation. Give an exact solution:

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