

3343 (Spring 2008) Assignment 1

Due: Jan 23 before class starts

1. (20 points) Order the following functions according to their order of growth from the lowest to the highest. If you think that two functions are of the same order (i.e. $f(n) = \Theta(g(n))$). Then put them in the same group.

$\log(n + 100), n^n, 10^n, n^2, (n + 1)!, n, 0.01n^4 + 3n^3 + 1, \log n + 100n, n^2 \log n.$

2. (20 points) Show that, if c is a positive real number, then $g(n) = 1 + c + c^2 + \dots + c^n$ is:

- $\Theta(1)$ if $c < 1$.
- $\Theta(n)$ if $c = 1$.
- $\Theta(c^n)$ if $c > 1$.

3. (20 points) Using the basic definition method, show that $10n^2 = O(n^3)$.