Analysis of Algorithms: Assignment 2

Due date: February 2 (Wednesday)

Problem 1 (6 points)
For each of the following functions, give an asymptotically tight bound (Θ-notation). Make your expression inside Θ as simple as possible.

Example: $2n^3 + 3n^2 = \Theta(n^3)$.

(a) $(n+1)^9$

(b) $(n+2) \cdot (2n+1) \cdot \sqrt{n+1}$

(c) $n^9 + 9^n$

(d) $(n^{4/3} + n^{5/3} + \lg n)^{3/5}$

(e) $2^n + n! + n^n$

(f) $2^{\left(2^{\lg\left(\frac{\log_3 n}{\log_3 2}\right)}\right)}$

Problem 2 (4 points)
Give an example of functions $f(n)$ and $g(n)$ such that $f(n) \neq O(g(n))$ and $f(n) \neq \Omega(g(n))$.