Analysis of Algorithms: Assignment 4

Due date: February 5 (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) $(n+2) \cdot (n+3) \cdot (n+6)$

(b) $(n+2)^2 \cdot (n+3)^3 \cdot (n+6)^6$

(c) $\sqrt{2n+2} \cdot \sqrt[3]{3n+3} \cdot \sqrt[6]{6n+6}$

(d) $2^{6 \cdot n} + 6^{2 \cdot n}$

(e) $(\sqrt{n})^n + n^{\sqrt{n}}$

(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 $g(n)$ that satisfy all of the following conditions:

$f(n) = O(g(n))$
$f(n) \neq \Theta(g(n))$
$f(n) \neq o(g(n))$