Section 7.2

7.2.1

Characterize the rate of growth of each function f below by giving a function g such that $f = \Theta(g)$. The function g should be one of the functions in the table of common functions.

a. $f(n) = n^8 + 3n - 4$

b. $f(n) = 2 \cdot 3^n$

c. $f(n) = 2^n + 3^n$

d. $f(n) = 7(\log \log n) + 3(\log n) + 12n$

e. $f(n) = 9(n \log n) + 5(\log \log n) + 5$

f. $f(n) = n \cdot \log_{37} n$

g. $f(n) = n^{21} + (1.1)^n$

h. $f(n) = 23n + n^3 - 2$

7.2.2

Give complete proofs for the growth rates of the polynomials below. You should provide specific values for c and n_0, and prove algebraically that the functions satisfy the definitions for $\mathcal{O}$ and Ω.

b. $f(n) = n^3 + 3n^2 + 4$. *Prove that* $f = \Theta(n^3)$