Homework 1

Due 09/10/2024

September 2, 2024

Use the *formal definitions* of Big-Oh, Big-Omega, and Big-Theta to prove the following.

1. Prove that $\sqrt{(n+1)^3} = \Omega(n\sqrt{n})$. *Hint*: $\sqrt{ab} = \sqrt{a}\sqrt{b}$, for any nonnegative real numbers a and b.
2. Prove that if $f_1(n) = O(g_1(n))$ and $f_2(n) = O(g_2(n))$, then $f_1(n)f_2(n) = O(g_1(n)g_2(n))$.
3. Prove that if $f(n) = O(g(n))$ and $g(n) = O(h(n))$, then $f(n) = O(h(n))$.