Names: _____

CISC320 - Spring 2021 - Lesson 05- Bounds and Big Oh - 1.0.1

Question 1 (2 points)

True or False? Show your work!

(a) $2^{n+1} = O(2^n)$

(b) $2^{2n} = O(2^n)$

Question 2 (3 points)

For each of the following pairs of functions, either $f(n)$ is in $O(g(n))$, f(n) is in $\Omega(g(n))$, or $f(n) = \Theta(g(n))$. Determine which relationship is correct and briefly explain why.

(a) $f(n) = \sqrt{n}$ and $g(n) = \log(n^2)$

(b) $f(n) = 2^n$ and $g(n) = 3^n$

(c) $f(n) = 2\sqrt{(n)} + \log(n)$ and $g(n) = \sqrt{(n)} + 5$

Question 3 (2 points)

Why is $n^2 = O(2^n)$

Question 4 (3 points)

For each of the following pairs of functions $f(n)$ and $g(n)$, give a minimal positive integer constant C such that $f(n) \leq C \cdot g(n)$ for all $n > 1$.

(a) $f(n) = n^2 + n + 1$ and $g(n) = 2n^3$

(b) $f(n) = n \cdot \sqrt{n} + n^2$ and $g(n) = n^2$

(c) $f(n) = n^2 - n + 1$ and $g(n) = \frac{n^2}{2}$