

Assignment 1

Tuesday, September 6, 2022 9:14 AM

$$2(a) f(n) = 3n^2 + 5$$

$$g(n) = n$$

$$\text{For any } c: \quad cn < 3n^2 \\ (\text{when } n > c)$$

$$\text{Hence, } 3n^2 + 5 \neq O(n)$$

$$(b) f(n) = n^{1.1}$$

$$g(n) = n$$

$$\text{For any } c: \quad cn < n^{1.1} \\ (\text{when } n > c)$$

$$\text{Hence, } n^{1.1} \neq O(n)$$

$$(c) n^2 \log(n) \in \Theta(n^2)$$

$$n^2 \log(n) = \Omega(n)$$

$$n^2 \log(n) \neq O(n)$$

$$f(n) = n^2 \log(n)$$

$$g(n) = n^2$$

$$\text{for any } c: \quad cn^2 < n^2 \log(n) \\ (\text{when } c < \log(n))$$

$$\text{Hence, } n^2 \log(n) \neq \Theta(n^2)$$

$$(d) f(n) = 2^n$$

$$g(n) = n!$$

Q.11 - . . .

for any $C \in \mathbb{C}$ $C n! > 2^n$

when $n > 3$

$$(e) \quad f(n) = n^4 + n^3$$

$$g(n) = n^4$$