

ASSIGNMENT#1

Q1) $7n - 2 = O(n)$

$F(n) \leq c g(n)$ for all $n \geq K$

$F(n) = 7n - 2$

$g(n) = n$

$c = 7$

$7n - 2 \leq 7n$

$n = 1$

$7(1) - 2 \leq 7(1)$

$5 \leq 7$

$\forall n \geq 1$

$n = 2$

$7(2) - 2 \leq 7(2)$

$12 \leq 14$

$\forall n \geq 1$

Proved

Q2) $7n - 2 = \Theta(n)$

$c_1 g(n) \leq f(n) \leq c_2 g(n)$ for all $n \geq K$

$f(n) = 7n - 2$

$g(n) = n$

$c_1 = 5$

$c_2 = 7$

$5n \leq 7n - 2 \leq 7n$

$\forall n \geq K$

$n = 1$

$5(1) \leq 7(1) - 2 \leq 7(1)$

$\forall n \geq 1$

$5 \leq 5 \leq 7$

$\forall n \geq 1$

$n = 2$

$5(2) \leq 7(2) \leq 7(2)$

$\forall n \geq 1$

$10 \leq 12 \leq 14$

$\forall n \geq 1$

Proved

$$Q3) \cdot 7n - 2 = \Theta(n^2)$$

$$c_1 g(n) \leq f(n) \leq c_2 g(n)$$

$$f(n) = 7n - 2$$

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

$$c_1 = 5$$

$$c_2 = 7$$

$$5n^2 \leq 7n - 2 \leq 7n^2$$

$$n = 1$$

$$5(1)^2 \leq 7(1) - 2 \leq 7(1)^2$$

$$5 \leq 5 \leq 7$$

$$n = 2$$

$$5(2)^2 \leq 7(2) - 2 \leq 7(2)^2$$

$$20 \leq 12 \leq 28$$

Hence not proved because this is transpose symmetric property this property only satisfies for O and Ω notation.

$$Q4) 3n^3 + 20n^2 + 5 = O(n^6)$$

$$3n^3 + 20n^2 + 5 \leq c(n^6)$$

$$\frac{3n^3 + 20n^2 + 5}{n^6} \leq c$$

$$n = 1$$

$$\frac{3(1)^3 + 20(1)^2 + 5}{(1)^6} \leq c$$

$$28 \leq c$$

$$n = 2$$

$$3(2)^3 + 20(2)^2 + 5 \leq 28(2)^6$$

$$24 + 80 + 5 \leq 1792$$

$$109 \leq 1792$$

proved

