

\* Ex: Find upper bound for  $f(n) = 3n + 8$

(1)

$$3n + 8 \leq 4n, \quad \forall n \geq 8.$$

$$\Rightarrow 3n + 8 = O(n) \text{ với } c = 4 \text{ và } n_0 = 8.$$

+). EX1:

$$f(n) = 3n + 5.$$

$$3n + 5 \leq 4n, \quad \forall n \geq 5.$$

$$\Rightarrow 3n + 5 = O(n) \text{ với } c = 4, n_0 = 5.$$

$$\Rightarrow f(n) = 4n^2 + 3.$$

$$4n^2 + 3 \leq 5n^2, \quad \forall n \geq 3$$

$$\Rightarrow 4n^2 + 3 = O(n^2) \text{ với } c = 5, n_0 = 3$$

+). EX2. Find upper bound for  $f(n) = n^2 + 1$ .

$$n^2 + 1 \leq 2n^2, \quad \forall n \geq 1.$$

$$n^2 + 1 = O(n^2), \text{ với } c = 2 \text{ and } n_0 = 1.$$

+). EX3. Find upper bound for  $f(n) = n^4 + 100n^2 + 50$

$$\Rightarrow n^4 + 100n^2 + 50 \leq 2n^4 \text{ với } \forall n \geq 11$$

$$n^4 + 100n^2 + 50 = O(n^4) \text{ với } c = 2, n_0 = 11$$

+). EX4. Find bound for  $f(n) = 2n^3 - 2n^2$

$$2n^3 - 2n^2 = O(n^3) \text{ với } c = 2, n_0 = 1.$$

+). EX5. Find upper bound for  $f(n) = n$

$$n \leq n, \quad \forall n \geq 1$$

$$\Rightarrow n = O(n) \text{ với } c = 1, n_0 = 1$$

+). EX6.  $f(n) = 410$ .

$$410 \leq 410 = O(1) \quad \forall n \geq 1.$$