

4)

$$a) \quad a = 4 \quad b = 2 \quad \log_2 4 = 2$$

$$T(n) = n \quad \therefore \quad \cancel{T(n) = O(n^2)} \quad T(n) = O(n^{2-\epsilon}) \quad \text{para } \epsilon = 1$$

\log_2

$$T(n) = \Theta(n^2)$$

$$b) \quad a = 4 \quad b = 2 \quad \log_2 4 = 2$$

$$T(n) = n^2$$

$$\text{Portanto para } k = 0 \quad T(n) = \Theta(n^2 \cdot \log^k n) \rightarrow T(n) = \Theta(n^2)$$

\log_2

$$T(n) = \Theta(n^2 \cdot \log n)$$

$$c) \quad a = 4 \quad b = 2 \quad \log_2 4 = 2$$

$$T(n) = n^3$$

$$T(n) = \Omega(n^{2-\epsilon}) \quad \text{para } \epsilon = 0,1$$

$$\log_2: \quad a. \quad f\left(\frac{n}{b}\right) \leq c \cdot f(n) \rightarrow 4 \cdot f\left(\frac{n}{2}\right) \leq c \cdot f(n)$$

$$T(n) \geq \frac{4 \cdot f\left(\frac{n}{2}\right)}{f(n)} \rightarrow c \geq 4 \cdot \frac{n^3}{n^3} \quad c \geq \frac{4}{1} \quad \checkmark$$

\log_2

$$T(n) = \Theta(n^3)$$