a) Which of the following statements are true? Do not prove your answers.
   I. $n^2 \in O(n^3)$
   II. $n^2 \in \Omega(n^3)$
   III. $n^2 \in \Theta(n^3)$

b) Solve the following recurrence.

$$t(m) = \begin{cases} 
0 & \text{if } m = 0 \\
2t(m-1) + 1 & \text{otherwise}
\end{cases}$$