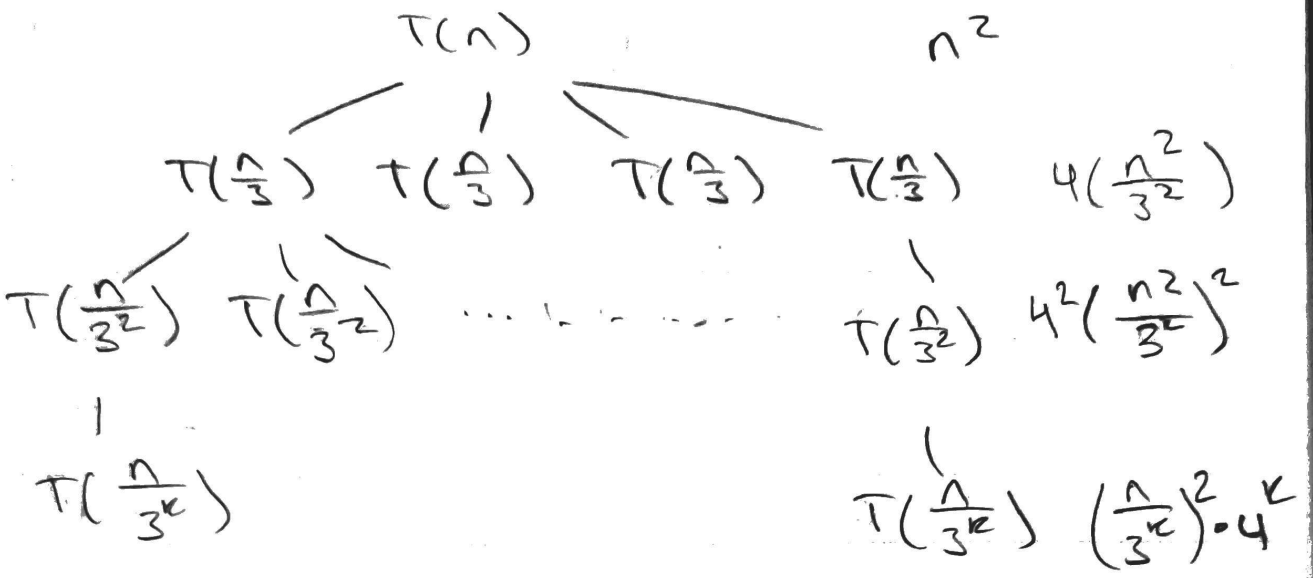
C. $T(n) = 4T\left(\frac{n}{3}\right) + O(n^2)$



$\frac{n}{3^k} = 1 \Rightarrow n = 3^k \quad k = \log_3 n$

$$T(n) = cn^2 + 4c\left(\frac{n}{3}\right)^2 + 4^2c\left(\frac{n}{3^2}\right)^2 + \cdots + 4^kc\left(\frac{n}{3^k}\right)^2$$

$$T(n) = cn^2\left(1 + \frac{4}{3^2} + \frac{4^2}{3^4} + \cdots + \frac{4^k}{(3^k)^2}\right)$$

$$T(n) = cn^2 \cdot \frac{9}{5}\left(1 - \left(\frac{4}{9}\right)\log_3 n\right)$$

$$T(n) = cn^2 \log_3 n$$

$$T(n) = O(n^2 \log_2 n)$$