姓名: SOLUTION　　葉均承　　應數一線性代數

學號: _____　　**Quiz 3**　　考試日期: 2025/03/18

1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!

1. Let the sequence $a_0, a_1, a_2, ...$ be given by $a_0 = 2, a_1 = 5$ and $a_k = 5a_{k-1} - 6a_{k-2}$ for $k \geq 2$. Find a_n.

   Answer: $a_n =$ $2^n + 3^n$

2. Solve the given system.

$$\begin{cases} x_1' = & 3x_1 & -x_2 & +x_3, \\ x_2' = & & 2x_2 & , \\ x_3' = & x_1 & -x_2 & +3x_3 \end{cases}$$

Answer: $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 0 & 2 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} k_1e^{4t} \\ k_2e^{2t} \\ k_3e^{2t} \end{bmatrix} = \begin{bmatrix} k_1e^{4t} - k_2e^{2t} + k_3e^{2t} \\ k_3e^{2t} \\ k_1e^{4t} + k_2e^{2t} + k_3e^{2t} \end{bmatrix}$,

Solution：

Note that the solution is not unique!