1. (4 points) A matrix $A$ is given. Find, if possible, an invertible matrix $P$ and a diagonal matrix $D$ such that $A = PDP^{-1}$. Otherwise explain why $A$ is not diagonalizable.

$$A = \begin{bmatrix} 1 & 5 \\ -1 & -1 \end{bmatrix},$$

2. (4 points) Use 1 to compute $A^4$ (No credit for other methods!)

**Reminder 1:** $5^4 = 625$

**Reminder 2** The quickest way to find the inverse of a $2 \times 2$ matrix is to use the formula:

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}.$$

3. (1 point each). True or False. Explain briefly!

(a) Every diagonalizable $4 \times 4$ matrix has 4 distinct eigenvalues.

(b) A diagonal matrix is diagonalizable.