1. Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be a linear transformation defined by $T(x_1, x_2) = (-5x_1 + 9x_2, 4x_1 - 7x_2)$.

   Show that T is invertible, and find a formula for T^{-1}.

   Hint: first find the standard matrix for T.

2. Let $A = \begin{bmatrix} 1 & 3 & 5 \\ 0 & 1 & 4 \\ 0 & 2 & 7 \end{bmatrix}$.

   a. Find A^{-1}, the inverse of A.

   b. Find A^T and $\left(A^T \right)^{-1}$.

3. Solve the equation for X:

   $$\begin{bmatrix} 4 & 3 \\ -7 & -9 \end{bmatrix} X + \begin{bmatrix} -1 & 9 \\ 9 & -3 \end{bmatrix} = \begin{bmatrix} -3 & -9 \\ -8 & -7 \end{bmatrix}$$