> *There is hardly any theory which is more elementary than linear algebra, in spite of the fact that generations of professors and textbook writers have obscured its simplicity by preposterous calculations with matrices.*

Name and section: ______________________________

1. Let $T : \mathbb{R}^2 \to \mathbb{R}^3$ be given by $T \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 3x_1 - 2x_2 \\ 4x_2 \\ -5x_1 + x_2 \end{bmatrix}$.

   (a) (2 points) Write down the matrix A such that $T(x) = Ax$ for all $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$.

   (b) (3 points) Is T one-to-one? Is it onto? Explain your answer.

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

   (a) (3 points) Calculate A^{-1} (the inverse of A) using row reduction.

   (b) (2 points) Use this to solve $Ax = \begin{bmatrix} 0 \\ -2 \\ 1 \end{bmatrix}$.