You have 20 minutes to take this quiz, for a total of 10 points.

Name:_____

1. (*5 points total*) Given $T(x_1, x_2, x_3) = (x_1 - 2x_2 + x_3, -4x_1 + 5x_2 + 6x_3)$

a) (*2 points*) Write down the matrix of T (i.e., write down the matrix A such that $T(\mathbf{x}) = A\mathbf{x}$, for any $\mathbf{x}$).

b) (*3 points*) Is $T : \mathbb{R}^3 \to \mathbb{R}^2$, as given above, one-to-one? Is it onto? (answer with brief explanation)

2. (*5 points total*) $A = \begin{bmatrix} 4 & 1 & 3 \\ 2 & 3 & -6 \\ -1 & 1 & -2 \end{bmatrix}$

a) (*3 points*) Calculate the inverse of A using row reduction.

b) (*2 points*) Use this to solve $A\mathbf{x} = \begin{bmatrix} 1 \\ 3 \\ -4 \end{bmatrix}$.