MATH 3191 Written Homework 3
____/20 points

Name: _____

Due: February 9th

Show all work that leads to your answers. I will be providing feedback on the work as well as the answers!

1. (10 points) Determine if the following 4 vectors are linearly independent.

$$\begin{bmatrix}1\\0\\3\\4\end{bmatrix}, \quad \begin{bmatrix}3\\2\\-1\\0\end{bmatrix}, \quad \begin{bmatrix}1\\1\\-3\\2\end{bmatrix}, \quad \begin{bmatrix}1\\1\\-5\\10\end{bmatrix}$$

2. (10 points) Let T be a linear transformation from $\mathbb{R}^2$ to $\mathbb{R}^3$ such that

$$T\left(\begin{bmatrix} 1 \\ -1 \end{bmatrix}\right) = \begin{bmatrix} 2 \\ 0 \\ 5 \end{bmatrix} \text{ and } T\left(\begin{bmatrix} 1 \\ 1 \end{bmatrix}\right) = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$$

Compute the matrix A such that $T(\boldsymbol{x}) = A\boldsymbol{x}$, then using this matrix, compute

$$T\left(\begin{bmatrix} 2 \\ 4 \end{bmatrix}\right)$$