

NOTE: If you use the RREF of a matrix to answer any question, be sure to write that matrix down as part of your answer! Use “vector hats”, and the word “free” where appropriate.

1. Let $A = \begin{bmatrix} -2 & 0 & 4 & -4 \\ 2 & -3 & -19 & 13 \\ -3 & 2 & 16 & -12 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} 11 \\ -3 \\ 11 \end{bmatrix}$, and $\mathbf{z} = \begin{bmatrix} 0 \\ 2 \\ 1 \\ 0 \end{bmatrix}$.

1A) Is \mathbf{b} in the span of the set of column vectors of A ? *Explain!*

1B) Find the vector $A\mathbf{z}$.

1C) Is the span of the set of column vectors of A equal to \mathbb{R}^3 ? *Explain!*

2. Use the methods and notation developed in class to solve this system of equations:

$$\begin{cases} -2x_1 & & + 4x_3 & - 4x_4 & = 8 \\ 2x_1 & - 3x_2 & - 19x_3 & + 13x_4 & = 1 \\ -3x_1 & + 2x_2 & + 16x_3 & - 12x_4 & = 6 \end{cases}$$