Fluency Assessment Outcome EV-5 Attempt 1

This assessment should be complete **closed book**; you are permitted to use sage/octave as instructed in class, unless specifically directed not to. Read each question carefully and be sure to upload all work as a .pdf file to gradescope.

1. (a) Consider the set of vectors

$$\left\{ \begin{bmatrix} -3 \\ -4 \\ -4 \\ 4 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 4 \\ 5 \\ 5 \\ -5 \end{bmatrix}, \begin{bmatrix} 4 \\ 4 \\ 3 \\ -1 \end{bmatrix} \right\}$$

   i. Write a statement ***involving spanning and linear independence*** that's equivalent to this claim: "The set of vectors is a basis for $\mathbb{R}^4$."

   ii. Explain and demonstrate how to determine whether or not these statements are true.

   (b) Consider the set of vectors

$$\left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} -3 \\ 1 \\ -1 \\ 3 \end{bmatrix}, \begin{bmatrix} -1 \\ -2 \\ 3 \\ -3 \end{bmatrix}, \begin{bmatrix} -3 \\ -4 \\ 6 \\ -6 \end{bmatrix} \right\}$$

   i. Write a statement ***involving the solutions of a vector equation*** that's equivalent to this claim: "The set of vectors is a basis for $\mathbb{R}^4$."

   ii. Explain and demonstrate how to determine whether or not these statements are true.