Last name _____

First name _____

LARSON—MATH 310–HOMEWORK WORKSHEET 04

1. Write up a **neat** assignment on a **new sheet** of paper. (Do not cram your answers between the lines). Typed using LaTeXwould be even better.
2. **Number** your problems so that it is easy to see what work matches the assigned problems.
3. Be verbose. Remember that you do not understand a concept if you do not know an **examples**.

Problems

1. (**Notation**). Let A be a list of vectors from a linear space V. What is $\langle A \rangle$? Give an example.
2. What is a *finite-dimensional vector space*? Give an example. Explain.
3. What is a *linearly independent* set of vectors? Give an example. Explain.
4. What is a *linearly dependent* set of vectors?
5. What is a *basis* of linear space? Give an example. Explain.
6. What is the *standard basis* of $\mathbb{R}^4$?
7. (a) Test if the vectors $\begin{bmatrix}1\\0\\0\end{bmatrix}, \begin{bmatrix}1\\1\\0\end{bmatrix}, \begin{bmatrix}1\\2\\0\end{bmatrix}$ are linearly independent or linearly dependent.

   (b) We argued in class that if a list of vectors is linearly dependent then one of the vectors can be written as a linear combination of the others. If these vectors are linearly dependent, find this linear combination.
8. (a) Test if the vectors $\begin{bmatrix}1\\1\\0\end{bmatrix}, \begin{bmatrix}0\\1\\1\end{bmatrix}, \begin{bmatrix}1\\2\\3\end{bmatrix}$ are linearly independent or linearly dependent.

   (b) We argued in class that if a list of vectors is linearly dependent then one of the vectors can be written as a linear combination of the others. If these vectors are linearly dependent, find this linear combination.
9. Argue that every list of vectors containing $\vec{0}$ linearly dependent?