# Linearly Independent Sets and Bases

MATH 204: Linear Algebra
Prepare for class November 9, 2018 Name (Print): _____

After reading Section 4.3, work through the following ideas.

1. What is the definition of a linear dependence relation? (It will be helpful to include other definitions in your answer.)

2. (a) State Theorem 4.4: Characterization of Linear Dependence. This should sound very familiar! Look back at Theorem 1.7!

   (b) After the statement of the theorem, the authors mentions what is different about linear dependence here in comparison to back in Theorem 1.7. What do they say?

3. What is the definition of a basis?

4. In the definition of a basis we have the set of vectors $\{\vec{b}_1, \vec{b}_2, \ldots, \vec{b}_p\}$. Must $\vec{b}_1, \vec{b}_2, \ldots, \vec{b}_p$ be in $H$ as defined in the definition of basis? Why or why not?

5. What is the standard basis for $\mathbb{R}^4$?

6. Try Exercises 1 in Section 4.3, page 215. You are asked if it is or is not a basis, and if it is not one, to state if one of the properties of a basis still holds.

7. Try Exercises 3 in Section 4.3, page 215. You are asked if it is or is not a basis, and if it is not one, to state if one of the properties of a basis still holds.

8. How many vectors do we need for a basis in $\mathbb{R}^3$? Justify your answer carefully.

9. State Theorem 4.5: The Spanning Set Theorem.

10. Write down any questions you have on the reading.