Last name ______________________

First name ______________________

LARSON—MATH 310–CLASSROOM WORKSHEET 14
Vector Subspace, Homogeneous Linear System

Review: Chapter 3 of Klein's *Coding the Matrix* text

1. For a field $\mathbb{F}$ and finite set D why is the collection of functions $\mathbb{F}^D$ a vector space?

New

1. If $\hat{v_1}, \hat{v_2}, \ldots, \hat{v_n}$ are vectors in a vector space $\mathcal{V}$, why is $\text{Span}(\{\hat{v_1}, \hat{v_2}, \ldots, \hat{v_n}\})$ a vector space?

2. What is a *homogeneous linear system*?

3. Why are the solutions of a homogeneous linear system a vector space?

The Matrix: Chapter 4 of Klein's *Coding the Matrix* text

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 10 & 20 & 30 \end{bmatrix}$$

4. What is a *matrix* (traditionally)?

5. How can we view a matrix as a list of rows?

6. How can we view a matrix as a list of columns?

7. The entries of a traditional matrix are indexed by a pair of integers. How can we generalize the matrix idea to allow for matrices which are indexed any pairs (where each pair entry comes from a set $R \times C$, where R and C are finite sets)?

8. How can we view a (generalized) matrix as a *dict-of-rows*?

9. How can we view a (generalized) matrix as a *dict-of-columns*?