Part I (due Monday, April 15 at the beginning of class)

Carefully read the first part of Section 3.4 of *Understanding Linear Algebra*, stopping when you get to 3.4.2, Determinants and Invertibility, taking notes for yourself and answering the following questions. Review the syllabus for parts (a)–(c) that should be included in this assignment. Here are the reading questions for part (a). Please answer these as you go through the reading.

Reading Questions

1. Preview Activity 3.4.1 in the section you read

Part II: Exercises (prepare for class for Monday, April 15)

1. Activity 3.4.2 in the section you read

Part III: Homework (due Wednesday, April 10 at the beginning of class)

1. Let $T\colon \mathbb{R}^3 \to \mathbb{R}^3$ be the orthogonal projection of $\mathbb{R}^3$ onto the xy-plane, i.e., $T(x, y, z) = (x, y, 0)$.

    (a) What is $T \circ T$?

    (b) Is T invertible? Why or why not?

2. True or false (if true, prove; if false, give an explained counterexample):

    (a) If $T_1\colon V \to V$ and $T_2\colon V \to V$ are linear transformations, then $T_1 \circ T_2 = T_2 \circ T_1$.

    (b) If $T_1\colon U \to V$ and $T_2\colon V \to W$ are linear transformations and T_1 is not one-to-one, then neither is $T_2 \circ T_1$.

Running list of vocabulary words that could be a quiz word

- linear equation

- system of linear equations

- linear combination of a set of vectors

- span of a set of vectors

- linearly independent

- linearly dependent

- reduced row echelon form

- pivot

- homogeneous system

- free variable

- row equivalent

- consistent system

- inconsistent system

- trace of a matrix

- transpose of a matrix

- inverse of a matrix

- elementary matrix

- transformation

- domain

- codomain

- range

- vector space (I will not ever ask you to define this on a quiz—the definition is way too long—but you should make sure you know what makes something a vector space)

- subspace

- basis

- finite-dimensional vector space

- dimension

- coordinate vector

- column space of A

- row space of A

- null space of A

- rank

- nullity

- linear transformation

- kernel

- range

- isomorphism

- isomorphic vector spaces