

## Part I (due Monday, March 25 at the beginning of class)

Read the definition of *linear transformation* at the top of the gold Linear Transformations handout and try out (a) and (b) in Example 1. Come prepared to discuss those two examples.

## Part II (due Wednesday, March 27)

There will be a **WeBWorK** assignment posted by Friday night. Note that there are various notational differences for the name of the transition matrix in some of the problems; stick to reading the words of the problems to tell you which transition matrix you're looking for.

## Part III: Homework (due Wednesday, March 27 at the beginning of class)

1. True or False? If true, prove; if false, give an explained counterexample.
  - (a) If  $P_{\mathcal{B}_1 \rightarrow \mathcal{B}_2}$  is a diagonal matrix, then each vector in  $\mathcal{B}_2$  is a scalar multiple of some vector in  $\mathcal{B}_1$ .
  - (b) If each vector in  $\mathcal{B}_2$  is a scalar multiple of some vector in  $\mathcal{B}_1$ , then  $P_{\mathcal{B}_1 \rightarrow \mathcal{B}_2}$  is a diagonal matrix.
  - (c) If  $A$  is a square matrix, then  $A = P_{\mathcal{B}_1 \rightarrow \mathcal{B}_2}$  for some bases  $\mathcal{B}_1$  and  $\mathcal{B}_2$  for  $\mathbb{R}^n$ .

## 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