

MATH 260, Homework 8, Fall '14
Due: October 17, 2014 at 2:20 PM
Honor Code:

Name:
Section:

1) (12 pts) Determine if the following sets of vectors are linearly independent. Briefly explain your reasoning.

a) $\left\{ \begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \right\}$

b) $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ -1 \end{bmatrix} \right\}$

c) $\left\{ \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 3 \\ 4 \end{bmatrix}, \begin{bmatrix} -1 \\ 0 \\ 0 \end{bmatrix} \right\}$

d) $\left\{ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \right\}$

2) (13 pts) For each vector space below, determine if the accompanying set is a basis for it. If it is not, add or remove vectors from the set until your new set is a basis for the vector space. State the dimension of the vector space.

a) \mathbb{R}^2 ; $\left\{ \begin{bmatrix} 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \end{bmatrix}, \begin{bmatrix} 5 \\ 6 \end{bmatrix} \right\}$

b) \mathbb{R}^3 ; $\left\{ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \right\}$

c) $\left\{ \begin{bmatrix} x \\ y \\ z \end{bmatrix} \mid x + y = 0 \right\}; \quad \left\{ \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix} \right\}$