Homework 6 Due: Monday, September 29

Book Problems:
Section 4.3 # 4, 5, 14, 17, 30, 32
Section 4.4 # 2, 4ab, 5, 10, 12

Solutions to Additional Problems:

Recall that the span of a set of vectors in V is a subspace of V. In some of the following problems, you will be asked to describe the span of sets of vectors in $\mathbb{R}^3$. Give a geometric description (e.g. it is a line) - you do not need to give any formulas.

1. Describe span $\left\{ \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$. point (the origin)

2. Is $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ in span $\left\{ \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$? no

3. Describe span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \right\}$. line

4. Is $\begin{bmatrix} 2 \\ 2 \\ 2 \end{bmatrix}$ in span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \right\}$? yes

5. Describe span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 2 \\ 2 \end{bmatrix} \right\}$. line

6. Is $\begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$ in span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \right\}$? no

7. Describe span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \right\}$. plane

8. Is $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ in span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \right\}$? yes

9. Describe span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \right\}$. plane

10. Is $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ in span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \right\}$? no

11. Describe span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \right\}$. $\mathbb{R}^3$

12. Which of the previously mentioned sets are spanning sets for $\mathbb{R}^3$?

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