Problem Set 4

Problems

1. Textbook Problems: 3.2.51, 3.2.52.
2. Textbook Problems: 3.3.3 to 3.3.10, 3.3.22, 3.3.26, 3.3.38 and 3.3.45.
3. Textbook Problems: 3.4.16, 3.4.22, 3.4.28, 3.4.30, 3.3.36.
4. a) Suppose $A \in \mathbb{R}^{m\times n}$ is such that $A + B = B$ for every $B \in \mathbb{R}^{m\times n}$. Find A.

   b) A matrix $A \in \mathbb{R}^{m\times n}$ is said to be a *zero matrix* if all of its entries are zero. If $B \in \mathbb{R}^{m\times n}$, what is $A + B$? $B + A$?

   c) Recall that if $x, y \in \mathbb{R}$ are such that $xy = 0$, then either $x = 0$ or $y = 0$. However, matrix multiplication does not have this property. Give an example of two nonzero matrices A and B such that AB is a zero matrix.
5. Solve for x, y, z and w:

$$\begin{bmatrix} x & 4 \\ 4y & w \end{bmatrix} - \begin{bmatrix} 4x & 2z \\ -3 & -2w \end{bmatrix} = \begin{bmatrix} 12 & 8 \\ y & 6 \end{bmatrix}.$$

6. Rewrite the matrix equation the following matrix equation as a linear system of linear equations:

$$\begin{bmatrix} 3 & 1 & 0 \\ 2 & -2 & 1 \\ 1 & 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 9 \\ 2 \end{bmatrix}.$$

   Do NOT solve it.