Problem Set 1

1. Exercise 1.2.12.
2. Exercise 1.2.46.
3. Exercises 1.3.2 and 1.3.4
4. Exercises 1.3.22 to 1.3.26.
5. Exercise 2.3.12.
6. Exercise 2.4.14.
7. Exercise 2.4.26. Please read the coverage in the text book on the multiplication of matrices given in block form (pp. 87-88).
8. Exercise 2.4.34.
9. Exercise 2.4.39.
10. Let $A \in \mathbb{C}^{m\times p}$, $B, C \in \mathbb{C}^{p\times n}$. Prove that $A \cdot (B + C) = A \cdot B + A \cdot C$, using summation notation.
11. Use Maple to do the following:

   a) Use the matrix command in the linalg package to define the following matrix:

   $$\begin{bmatrix} 2 & 5 & 4 & 4 \\ 1 & 4 & 3 & 1 \\ 1 & -3 & -2 & 5 \end{bmatrix}$$

   At the Maple command prompt, type with(linalg): and then hit ENTER to load the linalg package. Use the help features of Maple to learn about how to use the function matrix.

   b) Use the functions mulrow and addrow to perform row operations on the matrix defined above in order to produce the following sequences of matrices, in the order given below:

   $$A = \begin{bmatrix} 2 & 5 & 4 & 4 \\ 2 & 8 & 6 & 2 \\ 1 & -3 & -2 & 5 \end{bmatrix}$$

   $$A_1 = \begin{bmatrix} 2 & 5 & 4 & 4 \\ 0 & 3 & 2 & -2 \\ 1 & -3 & -2 & 5 \end{bmatrix}$$

   $$A_2 = \begin{bmatrix} 2 & 5 & 4 & 4 \\ 0 & 3 & 2 & -2 \\ 2 & -6 & -4 & 10 \end{bmatrix}$$

   $$A_3 = \begin{bmatrix} 2 & 5 & 4 & 4 \\ 0 & 3 & 2 & -2 \\ 0 & -11 & -8 & 6 \end{bmatrix}$$

   Read the Help pages for mulrow and addrow to learn how to use them.

   c) Find the matrix M such that $M \cdot A = A_3$. Use the multiply function to verify your answer.

   d) Print out your maple worksheet, indicating the commands you have used and their outputs. Submit the Maple worksheet along with the rest of your problem set.