HW3

(*) Download Molerbook.pdf (see link on HW web page)
You will need this set of notes for the next two exercises AND for when we cover Google PageRank (not part of this homework).

(1) Read pages 48-62 on transformations. The portion in pages 48-54 you will execute in matlab. The portion 55-62 is optional (there might be things in there that you might like to investigate, as it leads to some new ways to exploit matlab).

(2) Read and execute in matlab Chapter 5 of Moler's book. (This is optional)
Hand in the following exercises:
5.1c, 5.2d,e,f, 5.3, 5.4, 5.7 (see page 70)
The command "rref" might also be useful in this set of exercises. Type "help rref" to find out what it does.

(3) Show that if the equation $Ax = \emptyset$ has a unique solution then A is left invertible. (This is exercise 3.8 from LADW)

(4) ~~Do exercise 6.1 from LADW~~

(4) (FROM LADW)

TRUE OR FALSE. Justify answer.

(a) Any system of linear equations has at least one solution

(b) Any system of linear equations has at most one solution.

(c) Any homogeneous system of linear equations has at least one solution

(d) Any system of n linear equations in n unknowns has at least one solution

(e) Any system of n linear equations in n unknowns has at most one solution.

(f) If the homogeneous system corresponding to a given system of linear equations has a solution then the given system has a solution.

(g) If the coefficient matrix of a homogeneous system of n linear equations in n unknowns is invertible, then the system has no non-zero solution.

(h) The solution set of any system of m equations in n unknowns is a subspace in $\mathbb{R}^n$

(i) The solution set of any homogeneous system of m equations in n unknowns is a subspace of $\mathbb{R}^n$

(5) (from LADW) Find a 2x3 system (2 equations, 3 unknowns) such that its general solution has a form

$$\begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + s \begin{pmatrix} 1 \\ 2 \\ 1 \end{pmatrix}, \text{ where } s \in \mathbb{R}$$