MATH256 HW#1 Due Date: 15/4/13

***Do not let the people copy out your homework, everyone must show their own work. In case of a violation, all homeworks may be graded as zero.***

***All answers must be clearly stated, the resposibility of insufficient (or unclear) explanation belongs to the student.***

1. Suppose an m by n (m×n) matrix A has rank r. Here m is the last non-zero number of your student ID, and n=3. If m<n the rank, r=m; else r=n. Complete the following sentences according to this information.
	1. The equation A*x*=b (always / sometimes but not always) has (a unique solution / many solutions / no solution). (5 pts)
	2. The column space of A is ........ dimensional inside a ....... dimensional space. The column space (contains / does not contain) all of the n dimensional vectors. (5 pts)
	3. The left null space of A has the dimension of ..... inside $R^{……}$. (5 pts)
2. a) Find all of the vectors in the space that formed by the intersection of the following planes in $R^{3}$, $x=3y and y=3z+2$ (20 pts).

b) Does the set of vectors in the intersection form a vector space? Explain the reason (5 pts).

1. Consider the A matrix given below;

$$A=\left[\begin{matrix}2&1\\0&3\\1&0\end{matrix}\right]$$

* 1. Is it possible to find a B matrix such that B×A gives identity matrix? If possible, find all of these B matrices. If not possible, explain the reason. (20 pts)
	2. Calculate the complete solution for $A^{T}x=\left[\begin{matrix}2\\1\end{matrix}\right]$. (15 pts)
	3. Find the row space and column space of the A matrix. (5 pts)
	4. Consider C matrices satisfying C×A=0 equation. Find the basis of the space formed by C matrices. Is this space a vector space? Explain. (15 pts)
1. Find a basis for the plane x-2y+3z=0 in $R^{3}$ (10 pts).