MATH256-Spring-2013, MT Exam Date: 02/04/13

*The books, GSM phones and calculators are not allowed. The lecture notes and books can be used. All the answers must be clearly stated, otherwise no partial credit will be given. The duration is 110 minutes.*

1. Consider an Amxn matrix and here, m and n are the last two non-zero numbers of your student ID. Choose the rank as possible maximum integer number. Answer the following questions according to this information, (give enough explanation for each answer)
	1. The row space of A has ..... dimensions inside ...... dimensional space. The missing dimension(s) is(are) in the ……………. which complements row space. (6 pts)
	2. The column space of A can be the solution space of a …… linear equation system that has …… equations and ….. unknowns. (6 pts)
	3. Ax=b is solvable for b vectors with following form: b=……. (6 pts)
2. a) Consider the following linear equation: $\frac{dy}{dx}-y=0$. Does the solution space a vector space? How many dimensions the solution space has? Give the basis of this space. (10 pts)

b) Consider the following linear equation: x + y - 5z = 0. Does the solution space a vector space? How many dimensions the shape defined by solution space have? Give the base vectors for this space. (10 pts)

1. Write an A2x3 matrix with nonzero entries. This matrix should not satisfy BxA=I equation but must satisfy AxB=I equation.
2. Find all possible B matrices. (30 pts)
3. Is the space of B matrices a vector space? How many dimensions does this space have? Find the basis of this space? (20 pts)
4. Consider the following equation set,

$$Eq1: x+∝y+5z+3t=1$$

$$Eq2: 3x+3y+∝^{2}z-9t=2$$

$$Eq3: x+y+3z+∝t=2/3$$

Calculate $∝$ if that equation set has infinite solutions spanning a 2-dimensional plane(20 pts).