**MAT 2580 Review Exam2 Prof. Ghosh-Dastidar**

Topics to be covered from Ch. 1.7, 1.8, 2.1, 2.2, 2.3, and 2.8 (only column space)

1. Consider the problem of determining whether the following system of equations is consistent.



1. Define appropriate vectors, and restate the problem in terms of linear combinations. Then solve the problem.
2. Define an appropriate matrix, and restate the problem using the phrase “columns of A.”
3. Define an appropriate linear transformation T using matrix (b), and restate the problem in terms of T.
4. Consider the problem of determining whether the following system of equations is consistent for all b1, b2, and b3.



1. Define appropriate vectors, and restate the problem in terms of Span{**v1**, **v2**, **v3**}. Then solve the problem.
2. Define an appropriate matrix, and restate the problem using the phrase “columns of A.”
3. Define an appropriate linear transformation T using the matrix (b), and restate the problem in terms of T.
4. Determine the value(s) of *a* such that  is linearly independent.
5. Explain why a set {**v1**, **v2**, **v3**, **v4**} in R5 must be linearly independent when {**v1**, **v2**, **v3**} is linearly independent and **v4** s not in Span{**v1**, **v2**, **v3**}.
6. State whether the following statements are TRUE or FALSE. Justify your answer.
7. If A and B are m x n, then both ABT and ATB are defined.
8. If AB = C and C has 2 columns, then A has 2 columns.
9. If BC=BD, then C=D.
10. If A and B are n x n, then (A+B)(A-B)=A2 – B2.
11. Let .
12. Compute A-1.
13. Can you compute AB and BA? Why or why not?
14. Compute AB and ATB.
15. Solve the following system of equations using matrix inversion. Find the inverse matrix manually and solve for **x** = **A**-1**b**

x + 4z  =  2  
        x + y + 6z  =  3  
        -3x - 10z  =  4

1. Linear Transformations from Rn to Rm.

(a), (b) and (c) Which of the following are linear? Justify your conclusion.

(a)



(b)



(c)



1. Suppose an n x n matrix A satisfies the equation. Show that 
2. Find a matrix A such that the transformation maps into 
3. Suppose A, B, and X are n x n matrices with A, X, and A – AX invertible, and suppose .
4. Explain why B is invertible.
5. Solve the equation for X. If a matrix needs to be inverted, explain why that matrix is invertible.
6. Construct bases for the column space. Justify your answer.

