MAS 3105 Feb 20, 2007
Quiz 3 and key Prof. S. Hudson

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1) [10pts] Use Cramer's Rule to solve for x_2. Show all your work clearly.

$$2x_1 + 3x_2 = 3$$
$$3x_1 + 2x_2 = 5$$

2) Short answer problems - 5pts each.

a) Solve for X (in terms of A, B^{-1}, I, etc), given that $2X + B = AX$.

b) Give an example of a pair of 2x2 matrices, A and B, such that no X solves part a).

c) Based on your MHW, tell me what you know about magic(24).

3) [20pts] True or False.
Let $L = \{\mathbf{v_1}, \mathbf{v_2}, \mathbf{v_3}, \mathbf{v_4}\} = \{(1,1,0)^T, (2,2,0)^T, (0,1,1)^T, (0,2,2)^T\}$.

L is a spanning set for R^3.

$L \cup \{\mathbf{e_1}\}$ is a spanning set for R^3.

L is linearly independent in R^3.

$\mathbf{e_1}, \mathbf{v_1}, \mathbf{v_4}$ is linearly independent in R^3.

$\mathbf{v_1}, \mathbf{v_3}, \mathbf{v_4}$ is linearly dependent in R^3.

4) [15pt] Choose ONE, to prove on the back; assuming A and B are nxn.

a) det A = det A^T (use induction).

b) det (AB) = det (A) det (B) (you can assume A is nonsingular).

c) Prove that if $L \subset V$, span(L) is a subspace of V.

Remarks and Answers: The average was about 40/60. The unofficial scale starts with A's = 48 to 60 etc (then, each letter grade is 10 percent (6 points) lower). I also computed the total of your 3 quiz scores, and estimated your semester grade on the upper right corner of your quiz. The average total was 123/180. This does not yet include your HW or MHW grades. I felt the grades were lowest on problem 2. Please practice problems like 2a) [which were also on HW2 and Quiz 2] until you've mastered them; these should be easy by now!

1) $x_2 = \det A_2 / \det A = -1/5$

2) $X = (A - 2I)^{-1}B$; $A = 2I$ and any $B \neq O$; It is a singular matrix

3) FTFTT

4) See the text.