

MATHEMATICS 221 L05 FALL 2007
MIDTERM EXAMINATION

Friday, November 2, 2007

Duration: 50 minutes

I.D.#

I agree that this paper may be placed at the front of the classroom for pick-up.				
Please initial either YES	<input type="checkbox"/>	or NO	<input type="checkbox"/>	<input type="checkbox"/>

NO CALCULATORS ALLOWED
ANSWER ALL QUESTIONS
SHOW ALL WORK

LAST NAME _____ FIRST NAME _____

[5] 1. Solve the system:

$$\begin{aligned} 3x - 2y + z - 5u &= 5 \\ -6x + 4y + z + 7u &= -4 \end{aligned}$$

[5] 2. Let $A = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$. Express A^{-1} as a product of elementary matrices.

LAST NAME _____ FIRST NAME _____

[5] 3. Let A be a square matrix. Prove that if A^2 is invertible then A is invertible.

[5] 4. Given that $A^{-1} = \begin{bmatrix} 7 & 2 & -6 \\ -3 & -1 & 3 \\ 2 & 1 & -2 \end{bmatrix}$. Find $\text{adj}A$.

LAST NAME _____ **FIRST NAME** _____

- [10] 5. Given that A and B are 3×3 matrices such that $\det A = -1$ and $\det B = 2$.
- (a) Find $\det(2(B^{-1})^T A^3)$.

(b) Find $\det(\text{adj}A - A^{-1})$.

[5] **6.** Let $A = \begin{bmatrix} 1 & x & x \\ x & 1 & x \\ x & x & 1 \end{bmatrix}$. Find all values of the number x so that A is not invertible.

[5] **7.** Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ defined by $T \left(\begin{bmatrix} x \\ y \end{bmatrix} \right) = \begin{bmatrix} 0 \\ y^2 \end{bmatrix}$ for any real numbers x and y . Show that T is not a linear transformation.