

Math NYC: Quiz 1 (June 12, 2006) Name: _____

[marks]

Answer the questions on looseleaf; show all your work! Hand in the question sheet along with your answers.

[5]

1. Use Gauss-Jordan elimination or Gaussian elimination with back substitution to find the general solution for the following system:

$$\begin{aligned}2x_1 + 4x_3 - 2x_4 &= 8 \\5x_2 + 2x_3 + 10x_4 &= 2 \\-3x_1 - x_2 - 6x_3 + x_4 &= -2\end{aligned}$$

2. Let $A = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 & -2 \\ 8 & -3 & 4 \end{bmatrix}$, and $C = \begin{bmatrix} 3 & 2 & 1 \end{bmatrix}$.

[2]

- (a) *Without* calculating the products, determine the sizes of the products or say whether the products are undefined:

- i. AB
- ii. BA
- iii. ABC^T
- iv. $B^T B + C^T C$

[2]

- (b) Calculate BC^T .

[6]

3. Indicate whether the statement is true or not. Justify your answer with a logical argument or a counter-example.

- (a) A linear system of two equations in three unknowns cannot be consistent.
- (b) Let A be a matrix. If $A^2 = 0$ then $A = 0$.
- (c) Let A and B be matrices. If the sum $AB + BA$ exists then A and B must be square matrices of the same size.