

Math NYC: Quiz 1 rewrite 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:

$$\begin{aligned}2x_1 + 4x_2 + 2x_4 &= -8 \\ -x_1 - 4x_2 - 2x_3 + 3x_4 &= 5 \\ 3x_1 + 4x_2 - 2x_3 + 7x_4 &= -11\end{aligned}$$

2. Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 5 \\ 0 & 6 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 2 & 0 & 4 \\ 6 & -1 & 3 & 2 \end{bmatrix}$, and $M = AB$. Find:

[2] (a) $(M)_{34}$

[2] (b) $\text{tr}(AA^T)$

- [6] 3. Indicate whether the statement is true or not. Justify your answer with a logical argument or a counter-example. (For parts (b) and (c), let A and B be 2×2 matrices.)

(a) A linear system of three equations in two unknowns cannot be consistent.

(b) $(A + B)^T = A^T + B^T$.

(c) If A^{-1} and B^{-1} both exist, then $(A + B)^{-1} = A^{-1} + B^{-1}$.