MH 2660 Quiz #2 12/12

Name: The Prof

Please also write your name on the back of this sheet near the top.

① Find A^{-1} if $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 2 & 0 & 3 \end{bmatrix}$.

(4pts)

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 2 & 0 & 3 & 0 & 0 & 1 \end{array}\right] \xrightarrow{-2r_1+r_3} \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 0 & 0 & 1 & -2 & 0 & 1 \end{array}\right]$$

$-r_3+r_1$, $-2r_3+r_2$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 3 & 0 & -1 \\ 0 & 1 & 0 & 4 & 1 & -2 \\ 0 & 0 & 1 & -2 & 0 & 1 \end{array}\right]$$

$$A^{-1} = \begin{bmatrix} 3 & 0 & -1 \\ 4 & 1 & -2 \\ -2 & 0 & 1 \end{bmatrix}$$

② Suppose A, B, and X are 2×2 matrices. Solve algebraically for X: $2AX = 3X + B$

(4pts)

$$2AX - 3X = B$$

$$(2A - 3I)X = B$$

$$(2A-3I)^{-1}(2A-3I)X = (2A-3I)^{-1}B$$

$(2A-3I)^{-1}(2A-3I) = I$

$$X = (2A-3I)^{-1}B$$

③ Find $\det A$ if $A = \begin{bmatrix} 2 & -1 & 3 \\ 4 & 1 & 0 \\ -2 & 1 & 1 \end{bmatrix}$.

(4pts)

$$|A| = -4\begin{vmatrix} -1 & 3 \\ 1 & 1 \end{vmatrix} + 1 \cdot \begin{vmatrix} 2 & 3 \\ -2 & 1 \end{vmatrix}$$

$$= -4(-1-3) + (2-(-6))$$

$$= 16 + 8 = 24$$