ECON 331

Tutorial Questions #2

Problem 1 Find AB = C If

$$A = \begin{bmatrix} 5 & 1 & 0 \\ 2 & 1 & -1 \end{bmatrix} \quad and \quad B = \begin{bmatrix} 4 & 3 \\ 1 & 1 \\ 0 & 2 \end{bmatrix}$$

Problem 2 Find both C = AB and D = BA if

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} \quad and \quad B = \begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$$

Problem 3 Find the determinant by LAPLACE Expansion of

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

Problem 4 Find the inverse of A using the formula $A^{-1} = \frac{1}{|A|}AdjA$ if

$$A = \left[\begin{array}{rrr} 1 & 1 \\ 2 & 3 \end{array} \right]$$

Problem 5 Find the inverse of A using the formula $A^{-1} = \frac{1}{|A|}AdjA$ if

$$A = \left[\begin{array}{rrrr} 9 & 11 & 4 \\ 3 & 2 & 7 \\ 6 & 10 & 4 \end{array} \right]$$

Problem 6 Solve the system Ax = d by matrix inversion, where

$$4x + 3y = 28$$
$$2x + 5y = 42$$

Problem 7 Solve for x_1, x_2, x_3 using Cramer's rule

$$4x_1 + x_2 - 5x_3 = 8$$

-2x₁ + 3x₂ + x₃ = 12
3x₁ - x₂ + 4x₃ = 5

Problem 8 Consider the following macroeconomic model:

$$goods \ market$$

$$1 \quad Y = C + I_0 + X_0 - M$$

$$2 \quad C = C_0 + bY$$

$$4 \quad M = M_0 + mY$$

The three endogenous variables are Y, C, and M. (X is exports, M is imports). I_0, X_0, C_0, M_0 are Constants and b and m are coefficients (both are between 0 and 1)

1. Write this system as a 3×3 matrix system Ax = d where

$$x = \left[\begin{array}{c} Y \\ C \\ M \end{array} \right]$$

- 2. Show that the determinant is |A| = 1 b + m
- 3. Use Cramer's Rule to Find Y, C, M