HOMEWORK 7 - MATH 110 DUE DATE: Friday, November 1 INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each problem is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Is the matrix $A = \begin{bmatrix} 2 & -1 \\ 5 & 3 \end{bmatrix}$ invertible? If yes, find its inverse.

2. Use the Gauss-Jordan method to solve the system of equations

3. Use the **inverse matrix method** to compute the solution of the system

$$\left\{\begin{array}{rrrr} 2x+y&=&5\\ -3x+2y&=&3\end{array}\right\}.$$

4. Let \rightarrow be the connective that is defined by the following truth table

$$\begin{array}{c|ccc} P & Q & P \rightarrow Q \\ \hline F & F & T \\ F & T & T \\ T & F & F \\ T & T & T \end{array}$$

Use the truth table method to show that $\neg (P \lor Q) \equiv \neg P \land \neg Q$ and $P \to Q \equiv \neg Q \to \neg P$.

5. The logical connective |, called **Sheffer stroke** is defined by the following truth table

$$\begin{array}{c|ccc} P & Q & P|Q \\ \hline F & F & T \\ F & T & T \\ T & F & T \\ T & T & F \\ \end{array}$$

Create the truth table for P|P and for (P|Q)|(P|Q). What do you observe?

6. Use truth tables to determine whether the following argument form is valid

$$\frac{P \to Q, Q \to P}{P \lor Q}.$$