EXAM 3 - MATH 110

Friday, November 15, 2002 INSTRUCTOR: George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

- 1. (a) Use truth tables to show that $P \to Q \equiv \neg P \lor Q$.
 - (b) Use (a) and De Morgan's laws to rewrite the negation of the statement "If Maria lives in Athens, then she lives in Greece".
 - (c) Use truth tables to show that the following argument form is valid

$$\begin{array}{c} P \to Q \\ \hline Q \to R \\ \hline P \to R \end{array}$$

(d) Use (c) to fill-in the statement that is missing below, to make the following argument valid

If I do not study hard, then I will not pass this class. If I do not pass this class, then I will have to retake this class.

- 2. Sharky, a leader of the underworld, was killed by one of his own band of four henchmen. Detective Sharp interviewed the men and determined that all were lying except for one. He deduced who killed Sharky on the basis of the following statements:
 - (a) Socko: Lefty killed Sharky.
 - (b) Fats: Muscles did not kill Sharky.
 - (c) Lefty: Muscles was shooting craps with Socko when Sharky was knocked off.
 - (d) Muscles: Lefty did not kill Sharky.

Who killed Sharky?