MAT 305
Assignment 1
Thursday, September 1, 2011

For full credit on these problems, each must be submitted with a complete and clear solution, showing all of your work. You may work with other classmates on these problems, but please indicate on your assignment if you received help. Partial answers and incomplete solutions may be eligible for some partial credit, depending on the level of completeness and demonstrated understanding.

1. Make a truth table for the following propositional forms, and identify each as a tautology, contradiction, or neither.
   (a) \((P \lor \sim Q) \land R\)
   (b) \((\sim (P \land Q)) \iff (P \Rightarrow \sim Q)\)

2. Suppose that \(A\) is a tautology and \(B\) is a contradiction. Are the following tautologies, contradictions, or neither?
   (a) \(A \lor B\)
   (b) \(A \land B\)
   (c) \(A \land \sim B\)

3. Give, if possible, an example of a true conditional statement for which
   (a) the converse is true.
   (b) the converse is false.
   (c) the contrapositive is true.
   (d) the contrapositive is false.