Quiz 2   MAD 2104   Summer A 2014

1. (8 pts) Write (in words) the negation of each of the following statements:

(a) I don't have a dog and I don't have a cat.

(b) If I have a dog then I don't have a cat.

(c) There is someone in this class who has a dog, but doesn't have a cat.

(d) There is only one person in this class who has a dog and a cat.

2. (8 pts) Determine the truth value of each of the following statements if the domain for all variables consists of all integers. Just the answer (True or False) is enough in each case.

(a) $\exists n\ (n^2 = 6)$

(b) $\forall n\ (n-1 \leq n)$

(c) $\forall m\ \exists n\ (m^2+1 < n)$

(d) $\exists m\ \forall n\ (m^2+1 < n)$

3. (10 pts) (a) Is the compound proposition $(p \vee q) \vee (p \to q)$ a tautology, a contradiction, or a contingency? Justify. (A contingency is a compound proposition which is neither a tautology nor a contradiction.)

(b) Are the expressions $(p \to q) \wedge (q \to r)$ and $p \to r$ logically equivalent? Justify.