APPM 3170: Discrete Mathematics - Fall 2008

Quiz #1
Lecturer: Manuel Lladser

YOUR NAME: ANSWER KEY

CIRCLE ONE: 3170/AUDIT student?

(a) What is a *tautology*?

It is a composed proposition that is always true regardless of the truth value of the propositions that compose it.

(b) Is $(q \Rightarrow p) \wedge p$ logically equivalent to q? Explain.

If q is false and p is true then $(q \Rightarrow p) \wedge p$ is true.
Hence $(q \Rightarrow p) \wedge p$ is not logically equivalent to q.

(c) Translate into english the following proposition: $\exists x \neq 0 \, \forall y \neq 0 \, (xy = 1)$.

There exists $x \neq 0$ such that for all $y \neq 0$, $x \cdot y = 1$.

(d) Is the proposition in part (c) true or false?

False

(e) Negate the proposition in part (c). Leave your final answer in terms of universal and existential quantifiers.

$\sim (\exists x \neq 0)(\forall y \neq 0)(xy = 1) \equiv (\forall x \neq 0)(\exists y \neq 0)(x \cdot y \neq 1)$