*Name:*_____
*ID:*_____

ECS 20: Discrete Mathematics
Midterm 1
October 23, 2007

Notes:

1) quizz is open book, open notes. No computers though…
2) You have 40 minutes, no more: I will strictly enforce this.
3) You can answer directly on these sheets (preferred), or on loose paper.
4) Please write your name at the top right of each page you turn in!
5) Please, check your work!
6) There are 6 questions total, each valued 5 points. I will grade however over a total of 25, i.e. one question can be considered "extra credit". You choose!

Part I: logic (3 questions, each 5 points; total 15 points)

Using truth tables or logical equivalences, establish for each of the three propositions below if it is a tautology, a contradiction or neither

1) $(p \wedge q) \vee (p \wedge \neg q) \vee (\neg p \wedge q) \vee (\neg p \wedge \neg q)$

2) $(p \wedge q \wedge r) \vee (\neg p) \vee (\neg q) \vee (\neg r)$

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3) $\neg(p \rightarrow \neg q) \rightarrow \neg(p \leftrightarrow \neg q)$

Part II: proofs (3 questions, each 5 points; total 15 points)

1) Prove or disprove that if *n* is an odd integer, then n^2+4 is a prime number.

2) Show that if n is an integer such that $n^2+4*n+3$ is odd, then *n* is even.

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3) Prove or disprove that $\forall n > 1$, there are no 3 integers x, y and z such that $x^n + y^n = z^n$