Spring 2015, QUIZ 2, MATH-201, NAME: Score.....

You have to show your work and write down your proof.

1. Use the truth table to decide if $(A \text{ xor } (B \text{ xor } C))$ is logically equivalent to $((A \text{ xor } B) \text{ xor } C)$.

2. Write the following as formulas:

- If every even number belongs to set M, then no even number belongs to set N.
- For every number from set A and every number from set B, it holds their product is equal to 16.
- For every real number x, there is a real number greater than x.

3. Is it true that for subsets A, B, C of a universe U that

$$\overline{(A \cup B)} \cap \overline{C} = \overline{(A \cap B) \cup C}.$$

4. Prove that for integers x and y, if $5x - y$ is odd, then x and y have opposite parity.
5. Prove that if n is an odd integer, then $4|3n^3 - n^2 + 3n - 1$.
6. Prove that if x is a positive real number then

$$\frac{1}{x} \geq 2 - x.$$

7. Using the following premises to prove $\neg C$:

$$\text{premises} \begin{cases} (C \vee D) \Rightarrow A \\ A \Rightarrow (X \wedge C) \\ \neg X. \end{cases}$$