Math 2013 - Introduction to Discrete Mathematics

Homework #1 - 2005.08.24

Due Date - 2005.08.31

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1. Show that the connectives $\wedge$, $\rightarrow$, and $\leftrightarrow$ can be expressed in terms of $\vee$ and $\sim$ only.

2. Prove or disprove the following:

$$p \leftrightarrow q \equiv (p \rightarrow q) \wedge (q \rightarrow p)$$

3. Prove by contradiction that $\sqrt{2}$ is an irrational number.

4. Let, a, b and c be arbitrary real numbers. Prove that if $ab = ac$, then either $a = 0$ or $b = c$.

5. Prove or disprove that the function $f(x) = 9x^2 - 471x + 6203$ yields a prime for any nonnegative integer.

6. What can be said about the statement $p \rightarrow q$ if it is known that $\sim p \vee q$ is true?

7. Write the truth table for the following statement:

$$(p \vee q) \wedge (r \rightarrow \sim p) \leftrightarrow \sim q \vee r$$