HOMEWORK 1

Question 1. Use truth tables to determine whether each of the following statements is a tautology.

(a) $((A \Rightarrow B) \Rightarrow (A \vee B))$

(b) $((A \wedge B) \Rightarrow (A \Rightarrow B))$

(c) $(A \Rightarrow (B \Rightarrow (A \wedge B)))$

Question 2. Negate each of the following statements.

(a) For all $\epsilon > 0$, there exist n and m such that $|n^2 - 3m^2| < \epsilon$.

(b) There exists n such that for all m, if $m > n$, then $2^m - 1$ is not a prime.

(c) For all $\epsilon > 0$, there exists $\delta > 0$ such that for all x and y, if $|x - y| < \delta$, then $|x^3 - y^3| < \epsilon$.

WARNING: In order to receive full credit, your final answers should be written in mathematical English. In particular, your final answers should not include abbreviations such as $\forall x$, $\exists x$, $\Rightarrow$, etc. Of course, it is acceptable (and probably a good idea) to use these abbreviations in your working.