MATH 3310 HOMEWORK ASSIGNMENT 5

DUE ON FRIDAY 1 MARCH 2019

(1) Use truth tables to prove De Morgan's laws:
    (a) $\sim(p \wedge q) \equiv \sim p \vee \sim q$.
    (b) $\sim(p \vee q) \equiv \sim p \wedge \sim q$.

(2) State the negations of the following statements by reversing quantifiers:
    (a) For every rational number $q \neq 0$ the reciprocal $\frac{1}{q}$ is rational.
    (b) There exists a rational number q such that $q^2 = 5$.

(3) Prove the following statements:
    (a) Let $n \in \mathbb{Z}$. If $|n-1||n+1| < 0$, then $|n^2 - 1| > 1$.
    (b) Let $x \in \mathbb{R}$. If $x \in (\pi, 2\pi)$, then $x^2 - 5x + 7 \neq 0$.

(4) Prove the following statement:
        Let x, y and z be integers. If x and y are odd, then $xz + yz$ is even.

(5) Prove the following statement:
             $\forall x \in \mathbb{Z}$, $7x - 9$ is even if and only if x is odd.