Maths 1124 - Assignment 1

Q1. Write out the True/False tables to prove

(a) $(P \wedge Q)' \equiv P' \vee Q'$

(b) $P \vee (Q \wedge R) \equiv (P \vee Q) \wedge (P \vee R)$

(c) $P \vee Q \Rightarrow R \equiv (P \Rightarrow R) \wedge (Q \Rightarrow R)$

Q2. Write out the negation for each statement

(a) Some footballers are short

(b) All the lights are on

(c) No bounded interval contains infinitely many integers

(d) $\exists x$ in S such that $x \geq 5$

(e) $\forall x$ such that $0 < x < 1$, $f(x) < 2$ OR $f(x) > 5$

(f) If $x > 5$, then $\exists y > 0$ such that $x^2 > 25 + y$.

Q.3. If $A_1, A_2, A_3, \ldots, A_n, \ldots$ are sets

(a) If $A_1 \subset A_2 \subset A_3 \subset \cdots \subset A_n \subset \cdots$

Find $\liminf A_n$ and $\limsup A_n$.

(b) If $A_1 \supset A_2 \supset A_3 \supset \cdots \supset A_n \supset \cdots$

Find $\liminf A_n$ and $\limsup A_n$

Due: Monday 23rd.