Exercises for Lectures 8

Basic Logic

1. Prove that $p \vee (q \wedge r) \implies (p \vee q) \wedge (p \vee r)$.

2. Prove that $p \wedge (q \vee r) \implies (p \wedge q) \vee (p \wedge r)$.

3. Prove that $\sim (p \wedge q) \implies (\sim p) \vee (\sim q)$.

4. Suppose Bob is a plumber, Sam is a Cook and Tim sleeps late every day.

   Show that "If Sam is a Cook and Bob is not a plumber then Tim wakes up after 11 A.M. every day."

5. Write a negation for the following statement: "If a is prime and b is even, then either ab is starlike or $b^2 a^2$ is divisible by 3".

6. Write $r \implies s$ in conjunctive normal form.

7. Write $q \implies (r \implies s)$ in conjunctive normal form.