

1. Prove the following. Use only the original forms of the rules listed and show all substitutions needed to apply the rules.

$$p \vee q \Rightarrow r, r \Rightarrow s, p \mid- s$$

2. Prove the following. You may assume commutativity and associativity of \wedge and \vee and use the generalized versions of the rules.

$$p \vee q \Rightarrow (s \Rightarrow t), p \vee q \vee r, \neg(r \vee \neg s \vee \neg u) \mid- t \wedge u$$

3. Use conditional proof to prove the following.

$$p \vee t \Rightarrow r, q \wedge r \Rightarrow s \mid- p \wedge q \Rightarrow r \wedge s$$