

## Problems on Rules of Inference

For each of the following, show that the argument is valid by using the Rules of Inference or show that it is invalid by demonstrating a set of truth values for the atomic propositions that make the axioms true but the conclusion false.

1.  $p \Rightarrow q, \quad r \vee q, \quad p \vee \neg r \quad \vdash \quad q.$

2.  $s \Rightarrow (t \vee u), \quad t \Rightarrow u \quad \vdash \quad t.$

3.  $x \vee y, \quad z \Rightarrow y, \quad \neg y \quad \vdash \quad x \wedge z.$

4.  $(a \wedge b) \vee c, \quad a \Rightarrow \neg b \quad \vdash \quad c$

5.  $g \Rightarrow (f \vee h), \quad \neg f \Rightarrow \neg h \quad \vdash \quad g \Rightarrow f.$