

HW 2**Due:** 6 September 2011**Prof. Caldwell****COSC 3015**

Prove the following. You may use the methods taught by Cowles & Velleman (Givens and Goals) or use the sequent rules from the handout.

1. $\vdash (p \wedge q) \Rightarrow (p \vee q)$
2. $\vdash (p \wedge (p \Rightarrow q)) \Rightarrow q$
3. $\vdash ((p \wedge q) \Rightarrow r) \Rightarrow ((p \Rightarrow r) \vee (q \Rightarrow r))$
4. $\vdash (\exists x.P(x) \vee R(x)) \Rightarrow (\exists x.P(x)) \vee \exists x.R(x)$
5. $\vdash (\forall x.P(x) \wedge R(x)) \Rightarrow (\forall x.P(x)) \wedge \forall x.R(x)$
6. $\vdash \neg(\exists x.P(x)) \Rightarrow (\forall x.\neg P(x))$