

**Logic: Truth Tables - Exercises** (1 page; 16/7/15)

(1) Show that  $(p \wedge q) \vee \sim p \vee \sim q$  is a tautology (ie is always true)

(2) Show that  $p \Rightarrow q$  is equivalent to  $\sim q \Rightarrow \sim p$

(3) Show that  $p \Rightarrow q$  is (also) equivalent to  $\sim p \vee q$

(4) Show that  $p \wedge (q \vee r)$  is equivalent to  $(p \wedge q) \vee (p \wedge r)$  [ie one of the distributive rules]

(5) Show that  $\{p \vee (\sim q \wedge r)\} \wedge q$  is equivalent to  $p \wedge q$

(6)  $(a \wedge b) \vee (\sim a \wedge c) \vee (\sim b \wedge c) = \sim [(\sim a \wedge \sim c) \vee (\sim b \wedge \sim c)]$

[MEI, D2, June 2009, Q1]

(7) Show that  $[(p \Rightarrow q) \wedge (\sim p \Rightarrow r)] \wedge \sim r \Rightarrow q$

[MEI, D2, June 2007, Q1]