

COMPUTER SCIENCE 20, SPRING 2012  
DISCRETE MATHEMATICS FOR COMPUTER SCIENCE

Class #5 (Propositional Logic)

**Homework, due in hard copy Friday 2/3/2012 at 10:10am**

**Please write your TF's name on your homework, and list the names of any students with whom you collaborated.**

1. Determine which of the following are equivalent to  $(p \wedge q) \rightarrow r$  and which are equivalent to  $(p \vee q) \rightarrow r$ :\*
  - (a)  $p \rightarrow (q \rightarrow r)$
  - (b)  $q \rightarrow (p \rightarrow r)$
  - (c)  $(p \rightarrow r) \wedge (q \rightarrow r)$
  - (d)  $(p \rightarrow r) \vee (q \rightarrow r)$
2. The operators  $\neg$  and  $\vee$  are sufficient to define the rest of our operators as well. Using just  $\neg$  and  $\vee$  (and parentheses), write formulas involving  $p$  and  $q$  that are logically equivalent to
  - (a)  $p \wedge q$
  - (b)  $p \oplus q$
  - (c)  $p \Rightarrow q$
  - (d)  $p \Leftrightarrow q$

\*Credit: Paul Bamberg / Fun and Games with Discrete Mathematics