数理逻辑作业-2

1 用 $\{\neg, \to\}$ 表示下列公式:
(1) $p \wedge \neg q \leftrightarrow p \vee q$
(2) $\neg p \vee q \vee r \leftrightarrow p$
(3) $p \vee (p \wedge q) \leftrightarrow p$

2(p44-6). 用 $\downarrow$ 和 $\uparrow$ 表示下列公式:
(1) $\neg p \vee q$
(2) $p \wedge \neg q$
(3) $\neg p \vee \neg q$
(4) $p \leftrightarrow q$
(5) $(p \to \neg q) \to \neg r$

3(p85-1). 在PC中证明下列事实:
(1) $\vdash (A \to (A \to B)) \to (A \to B)$
(3) $A \to B, \neg(B \to C) \to \neg A \vdash A \to C$
(5) $\vdash (A \to (B \to C)) \to ((C \to D) \to (A \to (B \to D)))$
(7) $\vdash ((A \to B) \to (B \to A)) \to (B \to A)$
(9) $((A \to B) \to A) \to A$
(11) $((A \to B) \to C) \to ((A \to C) \to C)$
(13) $(A \to C) \to ((B \to C) \to (((A \to B) \to B) \to C))$