

**QUIZ # 5 - MATH 1090 - OCTOBER 25, 2002**

MIKE ZABROCKI - SECTION C - MWF 3:30- 4:20

(1) Prove Theorem number (3.78) using only Theorems (3.1) through (3.77)

$$(p \Rightarrow r) \wedge (q \Rightarrow r) \equiv (p \vee q \Rightarrow r)$$

Proof 1:

$$\begin{aligned} & (p \Rightarrow r) \wedge (q \Rightarrow r) \\ = & \langle (3.59) \text{ 2 times} \rangle \\ & (\neg p \vee r) \wedge (\neg q \vee r) \\ = & \langle (3.45) \text{ and } (3.24) \text{ several times} \rangle \\ & (\neg p \wedge \neg q) \vee r \\ = & \langle (3.47)(b) \rangle \\ & \neg(p \vee q) \vee r \\ = & \langle (3.59) \rangle \\ & (p \vee q \Rightarrow r) \end{aligned}$$

Proof 2 (the stupid proof):

$$\begin{aligned} & (p \Rightarrow r) \wedge (q \Rightarrow r) \equiv (p \vee q \Rightarrow r) \\ = & \langle (3.57) \rangle \\ & (p \vee r \equiv r) \wedge (q \vee r \equiv r) \equiv (p \vee q \Rightarrow r) \\ = & \langle (3.35) \rangle \\ & p \vee r \equiv r \equiv q \vee r \equiv r \equiv (p \vee r \equiv r) \vee (q \vee r \equiv r) \equiv (p \vee q \Rightarrow r) \\ = & \langle (3.57) \rangle \\ & p \vee r \equiv r \equiv q \vee r \equiv r \equiv (p \vee r \equiv r) \vee (q \vee r \equiv r) \equiv p \vee q \vee r \equiv r \\ = & \langle (3.27) \rangle \\ & p \vee r \equiv r \equiv q \vee r \equiv r \equiv ((p \vee r \equiv r) \vee q \vee r \equiv r) \equiv (p \vee r \equiv r) \vee r \equiv p \vee q \vee r \equiv r \\ = & \langle (3.27) \text{ 2 times} \rangle \\ & p \vee r \equiv r \equiv q \vee r \equiv r \equiv ((p \vee r \vee q \vee r \equiv r \vee q \vee r) \equiv (p \vee r \vee r \equiv r \vee r)) \equiv p \vee q \vee r \equiv r \\ = & \langle (3.26) \text{ many times} \rangle \\ & p \vee r \equiv r \equiv q \vee r \equiv r \equiv p \vee r \vee q \equiv q \vee r \equiv p \vee r \equiv r \equiv p \vee q \vee r \equiv r \\ = & \langle (3.2) \text{ many times} \rangle \\ & p \vee r \vee q \equiv p \vee r \equiv q \vee r \equiv r \equiv r \equiv p \vee q \vee r \equiv p \vee r \equiv q \vee r \equiv r \equiv r - (3.5) \end{aligned}$$