

Math Logic Assignment #1

Don Farnham

1) $\neg(A \wedge B) \rightarrow (A \rightarrow \neg B)$

$\neg(A \wedge B)$ ³	\overline{A} ²	\overline{B} ¹
	$(A \wedge B)$	
\perp		
$\neg B$ ¹		
	$A \rightarrow \neg B$ ²	
	$\neg(A \wedge B) \rightarrow (A \rightarrow \neg B)$ ³	

2) $(A \rightarrow C) \wedge (B \rightarrow \neg C) \rightarrow \neg(A \wedge B)$

$\overline{A \wedge B}$ ¹	$\overline{(A \rightarrow C) \wedge (B \rightarrow \neg C)}$ ²	$\overline{A \wedge B}$ ¹	$\overline{(A \rightarrow C) \wedge (B \rightarrow \neg C)}$ ²
A	$A \rightarrow C$	B	$B \rightarrow \neg C$
	C		$\neg C$
	\perp		
	$\neg(A \wedge B)$ ¹		
	$(A \rightarrow C) \wedge (B \rightarrow \neg C) \rightarrow \neg(A \wedge B)$ ²		

$$3.) (A \wedge B) \rightarrow ((A \rightarrow C) \rightarrow \neg(B \rightarrow \neg C))$$

$$\begin{array}{c}
 \begin{array}{c} \overline{A \wedge B}^1 \\ A \end{array} \quad \begin{array}{c} \overline{A \rightarrow C}^2 \\ C \end{array} \quad \begin{array}{c} \overline{A \wedge B}^1 \\ B \end{array} \quad \begin{array}{c} \overline{B \rightarrow \neg C}^3 \\ \neg C \end{array} \\
 \hline
 \perp \\
 \hline
 \overline{\neg(B \rightarrow \neg C)}^3 \\
 \hline
 \overline{(A \rightarrow C) \rightarrow \neg(B \rightarrow \neg C)}^2 \\
 \hline
 \overline{(A \wedge B) \rightarrow ((A \rightarrow C) \rightarrow \neg(B \rightarrow \neg C))}^1
 \end{array}$$