

Math Logic Assignment #1

Dom Farolino

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

| | | |
|--------------------|------------------------------------|--|
| $\neg(A \wedge B)$ | $\frac{\quad}{\neg(A \wedge B)}^3$ | $\frac{\neg A \quad \neg B}{A \wedge B}^1$ |
| | | $\frac{\perp}{\neg B}^2$ |
| | | $\frac{A \rightarrow \neg B}{\neg(A \wedge B) \rightarrow (A \rightarrow \neg B)}^3$ |

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

| | | | |
|--------------------------------|---|---|---|
| $\frac{\quad}{(A \wedge B)}^1$ | $\frac{\quad}{(A \rightarrow C) \wedge (B \rightarrow \neg C)}^2$ | $\frac{\quad}{(A \wedge B)}^1$ | $\frac{\quad}{(A \rightarrow C) \wedge (B \rightarrow \neg C)}^2$ |
| A | $A \rightarrow C$ | B | $B \rightarrow \neg C$ |
| | C | | $\neg C$ |
| | | $\frac{\perp}{\neg(A \wedge B)}^1$ | |
| | | $\frac{(A \rightarrow C) \wedge (B \rightarrow \neg C) \rightarrow \neg(A \wedge B)}{}^2$ | |

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

$$\frac{\overline{A \wedge B}^1}{\begin{array}{c} A \\ \hline C \end{array}} \quad \frac{\overline{A \rightarrow C}^2}{\hline}$$

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

$$\frac{\perp}{\neg(B \rightarrow \neg C)^3}$$

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