

第5回レポート解答

34.

$$\begin{array}{c}
 \begin{array}{c}
 1 \\
 \hline
 \forall x \neg A(x)
 \end{array}
 \qquad
 \begin{array}{c}
 3 \\
 A(a)
 \end{array} \\
 \hline
 \neg A(a)
 \end{array}
 \qquad
 \begin{array}{c}
 2 \\
 \exists x A(x)
 \end{array}
 \qquad
 \perp
 \qquad
 3$$

$$\begin{array}{c}
 \perp \\
 \hline
 \neg \exists x A(x)
 \end{array}
 \qquad
 2$$

$$\forall x \neg A(x) \supset \neg \exists x A(x)$$

1

50.

$\forall x \neg A(x) \supset \neg \exists x A(x)$ の応用

$$\begin{array}{c}
 \begin{array}{c}
 1 \\
 \hline
 \forall x A(x) \\
 \hline
 A(a)
 \end{array}
 \qquad
 \begin{array}{c}
 3 \\
 \neg A(a)
 \end{array}
 \\
 \hline
 \begin{array}{c}
 2 \\
 \exists x \neg A(x)
 \end{array}
 \qquad
 \perp
 \end{array}
 \qquad
 \begin{array}{c}
 3
 \end{array}
 \\
 \hline
 \perp
 \qquad
 2
 \\
 \hline
 \neg \exists x \neg A(x)
 \\
 \hline
 \forall x A(x) \supset \neg \exists x \neg A(x)
 \qquad
 1
 \end{array}$$

33再掲.

$$\begin{array}{c} \begin{array}{cc} \begin{array}{c} 1 \\ \neg \exists x A(x) \end{array} & \begin{array}{c} 2 \\ A(a) \\ \hline \exists x A(x) \end{array} \\ \hline \perp \\ \hline \neg A(a) \\ \hline \forall x \neg A(x) \\ \hline \neg \exists x A(x) \supset \forall x \neg A(x) \quad 1 \end{array} \end{array}$$

46再掲.

$$\begin{array}{c}
 \begin{array}{c}
 \neg \exists x \neg \text{と } \forall x \text{ の} \\
 \text{同値性}
 \end{array}
 \begin{array}{c}
 \text{3} \\
 \neg \exists x \neg A(x) \\
 \hline \hline
 \forall x A(x) \qquad \neg \forall x A(x) \\
 \hline
 \perp \\
 \hline
 \text{3} \\
 \neg \neg \exists x \neg A(x) \\
 \hline \hline
 \exists x \neg A(x) \\
 \hline
 \text{1} \\
 \neg \forall x A(x) \supset \exists x \neg A(x)
 \end{array}
 \end{array}
 \quad \begin{array}{l}
 \text{1} \\
 \\
 \\
 \\
 \text{二重否定の除去}
 \end{array}$$

51.

$\neg \forall x A(x) \supset \exists x \neg A(x)$ の応用

$$\begin{array}{rcl}
 & 3 & \\
 & \neg \exists x A(x) & \\
 \neg \exists x \text{ と } \forall x \neg \text{ の} & \text{=} & 1 \\
 \text{同値性} & & \\
 & \forall x \neg A(x) \quad \neg \forall x \neg A(x) & \\
 & \text{---} & \\
 & \bot & \\
 & \text{---} & 3 \\
 & \neg \neg \exists x A(x) & \\
 & \text{=} & \text{二重否定の除去} \\
 & \exists x A(x) & \\
 & \text{---} & 1 \\
 & \neg \forall x \neg A(x) \supset \exists x A(x) &
 \end{array}$$

51.誤答?例

$$\begin{array}{c}
 \begin{array}{c} \neg \exists x \neg \neg A(x) \end{array} \text{と} \begin{array}{c} \forall x A(x) \end{array} \text{の} \\
 \text{同値性}
 \end{array}
 \begin{array}{c}
 \begin{array}{c} 3 \\ \neg \exists x \neg \neg A(x) \end{array} \\
 \hline
 \begin{array}{c} 1 \\ \forall x \neg \neg A(x) \end{array}
 \end{array}
 \begin{array}{c}
 \hline
 \perp
 \end{array}
 \begin{array}{c}
 \begin{array}{c} 3 \\ \neg \neg \exists x \neg \neg A(x) \end{array} \\
 \hline
 \begin{array}{c} \exists x \neg \neg A(x) \end{array}
 \end{array}
 \begin{array}{c}
 \hline
 \begin{array}{c} \exists x A(x) \end{array}
 \end{array}
 \begin{array}{c}
 \hline
 \begin{array}{c} 1 \\ \neg \forall x \neg A(x) \supset \exists x A(x) \end{array}
 \end{array}
 \begin{array}{c}
 \text{二重否定の除去} \\
 \text{二重否定の除去}
 \end{array}$$

51.誤答?例

$$\begin{array}{c}
 3 \\
 \neg \exists x \neg \neg A(x) \\
 \hline \hline
 \forall x \neg A(x) \quad \neg \forall x \neg A(x) \\
 \hline
 \perp
 \end{array}$$

同値性

$$\begin{array}{c}
 3 \\
 \neg \neg \exists x \neg \neg A(x) \\
 \hline \hline
 \exists x \neg \neg A(x)
 \end{array}$$

二重否定の除去

$$\exists x \neg \neg A(x)$$

$$\begin{array}{c}
 \exists x A(x) \\
 \hline
 \neg \forall x \neg A(x) \supset \exists x A(x)
 \end{array}$$

二重否定の除去?

直接は除去できない



今回示す
置換定理を用いれば
証明できる