

t1_gate_5 (TM-
PQTCuYVBX7U1JwEPzvCVhj1b4A2WiBYMV)

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Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $k2_gate_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k10_gate_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_xboole_0 : \iota$ be given. Let $k11_gate_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_gate_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k2_gate_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k3_gate_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k4_gate_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k36_gate_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k35_gate_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0. \forall X1. (\neg v1_xboole_0 (k2_gate_1 X0 X1)) \Leftrightarrow ((\neg v1_xboole_0 X0) \wedge (\neg v1_xboole_0 X1)) \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (\neg(\neg v1_xboole_0 (k11_gate_1 \\ & X0 X1 X2)) \wedge ((\neg(\neg v1_xboole_0 X0) \wedge (\neg v1_xboole_0 X1)) \wedge ((\neg(\neg v1_xboole_0 \\ & X1) \wedge (\neg v1_xboole_0 X2)) \wedge (\neg(\neg v1_xboole_0 X2) \wedge (\neg v1_xboole_0 X0)))))) \wedge \\ & (\neg(\neg(\neg(\neg v1_xboole_0 X0) \wedge (\neg v1_xboole_0 X1)) \wedge ((\neg(\neg v1_xboole_0 \\ & X1) \wedge (\neg v1_xboole_0 X2)) \wedge (\neg(\neg v1_xboole_0 X2) \wedge (\neg v1_xboole_0 X0)))))) \wedge \\ & (v1_xboole_0 (k11_gate_1 X0 X1 X2))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (\neg(\neg v1_xboole_0 (k10_gate_1 \\ & X0 X1 X2)) \wedge ((\neg(((\neg v1_xboole_0 X0) \wedge (v1_xboole_0 X1)) \vee ((v1_xboole_0 \\ & X0) \wedge (\neg v1_xboole_0 X1))) \wedge (v1_xboole_0 X2)) \wedge (\neg(\neg(\neg v1_xboole_0 \\ & X0) \wedge (v1_xboole_0 X1)) \wedge ((\neg(v1_xboole_0 X0) \wedge (\neg v1_xboole_0 X1)) \wedge \\ & (\neg v1_xboole_0 X2)))))) \wedge (\neg(((\neg v1_xboole_0 X0) \wedge (v1_xboole_0 \\ & X1)) \vee ((v1_xboole_0 X0) \wedge (\neg v1_xboole_0 X1))) \wedge (v1_xboole_0 X2)) \vee \\ & ((\neg(\neg v1_xboole_0 X0) \wedge (v1_xboole_0 X1)) \wedge ((\neg(v1_xboole_0 X0) \wedge \\ & (\neg v1_xboole_0 X1)) \wedge (\neg v1_xboole_0 X2)))))) \wedge (v1_xboole_0 (k10_gate_1 \\ & X0 X1 X2))) \end{aligned} \quad (3)$$

Assume the following.

$$\forall X0. \forall X1. (v1_xboole_0 X0) \Rightarrow (v1_xboole_0 (k2_gate_1 X0 X1)) \quad (4)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v1_xboole_0 X0)\wedge(\neg v1_xboole_0 X1))\Rightarrow (\neg v1_xboole_0 (k2_gate_1 X0 X1)) \quad (5)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1_xboole_0 X0)\wedge(v1_xboole_0 X1))\Rightarrow(v1_xboole_0 (k11_gate_1 X2 X0 X1)) \quad (6)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1_xboole_0 X0)\wedge(v1_xboole_0 X1))\Rightarrow(v1_xboole_0 (k11_gate_1 X0 X2 X1)) \quad (7)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1_xboole_0 X0)\wedge(v1_xboole_0 X1))\Rightarrow(v1_xboole_0 (k11_gate_1 X0 X1 X2)) \quad (8)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1_xboole_0 X0)\wedge(\neg v1_xboole_0 X1))\Rightarrow(\neg v1_xboole_0 (k11_gate_1 X2 X0 X1)) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1_xboole_0 X0)\wedge((\neg v1_xboole_0 X1)\wedge(v1_xboole_0 X2)))\Rightarrow(v1_xboole_0 (k10_gate_1 X2 X0 X1)) \quad (10)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1_xboole_0 X0)\wedge((v1_xboole_0 X1)\wedge(\neg v1_xboole_0 X2)))\Rightarrow(\neg v1_xboole_0 (k10_gate_1 X0 X2 X1)) \quad (11)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1_xboole_0 X0)\wedge((v1_xboole_0 X1)\wedge(v1_xboole_0 X2)))\Rightarrow(v1_xboole_0 (k10_gate_1 X0 X1 X2)) \quad (12)$$

Assume the following.

$$v1_xboole_0 k1_xboole_0 \quad (13)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.k4_gate_5 X0 X1 X2 X3 = k36_gate_1 (k2_gate_1 X1 X2) (k2_gate_1 X0 X3) k1_xboole_0 (k2_gate_1 X1 X3) k1_xboole_0 \quad (14)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.k3_gate_5 X0 X1 X2 \\ X3 = & k35_gate_1 (k2_gate_1 X1 X2) (k2_gate_1 X0 X3) k1_xboole_0 (\\ & k2_gate_1 X1 X3) k1_xboole_0 \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k36_gate_1 \\ X0 X1 X2 X3 X4 = & k11_gate_1 X2 X3 (k11_gate_1 X0 X1 X4) \end{aligned} \quad (16)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k35_gate_1 \\ X0 X1 X2 X3 X4 = & k10_gate_1 X2 X3 (k11_gate_1 X0 X1 X4) \end{aligned} \quad (17)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.k2_gate_5 X0 X1 X2 \\ X3 = & k10_gate_1 (k2_gate_1 X1 X2) (k2_gate_1 X0 X3) k1_xboole_0 \end{aligned} \quad (18)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.k1_gate_5 X0 X1 X2 \\ X3 = & k2_gate_1 X0 X2 \end{aligned} \quad (19)$$

Theorem 1

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\
& \forall X6. \forall X7. \forall X8. \forall X9. \forall X10. \forall X11. \\
& \forall X12. \neg(\neg(\neg v1_xboole_0 X8) \wedge (v1_xboole_0 (k2_gate_1 X0 \\
& X2))) \wedge ((\neg(\neg v1_xboole_0 (k2_gate_1 X0 X2)) \wedge (v1_xboole_0 X8)) \wedge \\
& ((\neg(\neg v1_xboole_0 X9) \wedge (v1_xboole_0 (k10_gate_1 (k2_gate_1 X1 \\
& X2) (k2_gate_1 X0 X3) k1_xboole_0))) \wedge ((\neg(\neg v1_xboole_0 (k10_gate_1 \\
& (k2_gate_1 X1 X2) (k2_gate_1 X0 X3) k1_xboole_0)) \wedge (v1_xboole_0 \\
& X9)) \wedge ((\neg(\neg v1_xboole_0 X10) \wedge (v1_xboole_0 (k11_gate_1 (k2_gate_1 \\
& X1 X2) (k2_gate_1 X0 X3) k1_xboole_0))) \wedge ((\neg(\neg v1_xboole_0 (k11_gate_1 \\
& (k2_gate_1 X1 X2) (k2_gate_1 X0 X3) k1_xboole_0)) \wedge (v1_xboole_0 \\
& X10)) \wedge ((\neg(\neg v1_xboole_0 X11) \wedge (v1_xboole_0 (k10_gate_1 (k2_gate_1 \\
& X1 X3) k1_xboole_0 X10))) \wedge ((\neg(\neg v1_xboole_0 (k10_gate_1 (k2_gate_1 \\
& X1 X3) k1_xboole_0 X10)) \wedge (v1_xboole_0 X11)) \wedge ((\neg(\neg v1_xboole_0 \\
& X12) \wedge (v1_xboole_0 (k11_gate_1 (k2_gate_1 X1 X3) k1_xboole_0 X10))) \wedge \\
& ((\neg(\neg v1_xboole_0 (k11_gate_1 (k2_gate_1 X1 X3) k1_xboole_0 X10)) \wedge \\
& (v1_xboole_0 X12)) \wedge ((\neg(\neg v1_xboole_0 X4) \wedge (v1_xboole_0 X8)) \wedge \\
& ((\neg(\neg v1_xboole_0 X8) \wedge (v1_xboole_0 X4)) \wedge ((\neg(\neg v1_xboole_0 X5) \wedge \\
& (v1_xboole_0 X9)) \wedge ((\neg(\neg v1_xboole_0 X9) \wedge (v1_xboole_0 X5)) \wedge (\\
& (\neg(\neg v1_xboole_0 X6) \wedge (v1_xboole_0 X11)) \wedge ((\neg(\neg v1_xboole_0 X11) \wedge \\
& (v1_xboole_0 X6)) \wedge ((\neg(\neg v1_xboole_0 X7) \wedge (v1_xboole_0 X12)) \wedge \\
& ((\neg(\neg v1_xboole_0 X12) \wedge (v1_xboole_0 X7)) \wedge (\neg(\neg(\neg v1_xboole_0 \\
& X4) \wedge (v1_xboole_0 (k1_gate_5 X0 X1 X2 X3))) \wedge ((\neg(\neg v1_xboole_0 (\\
& k1_gate_5 X0 X1 X2 X3)) \wedge (v1_xboole_0 X4)) \wedge ((\neg(\neg v1_xboole_0 X5) \wedge \\
& (v1_xboole_0 (k2_gate_5 X0 X1 X2 X3))) \wedge ((\neg(\neg v1_xboole_0 (k2_gate_5 \\
& X0 X1 X2 X3)) \wedge (v1_xboole_0 X5)) \wedge ((\neg(\neg v1_xboole_0 X6) \wedge (v1_xboole_0 \\
& (k3_gate_5 X0 X1 X2 X3))) \wedge ((\neg(\neg v1_xboole_0 (k3_gate_5 X0 X1 X2 X3)) \wedge \\
& (v1_xboole_0 X6)) \wedge ((\neg(\neg v1_xboole_0 X7) \wedge (v1_xboole_0 (k4_gate_5 \\
& X0 X1 X2 X3))) \wedge (\neg(\neg v1_xboole_0 (k4_gate_5 X0 X1 X2 X3)) \wedge (v1_xboole_0 \\
& X7))))))))))))))))))))))))))
\end{aligned}$$