

t61_cat_4 (TMNQAsoxCiyLratFHSXwkLY- hEoKVLvrPhQ2)

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Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $v11_struct_0 : \iota \Rightarrow o$ be given. Let $v2_cat_1 : \iota \Rightarrow o$ be given. Let $v3_cat_1 : \iota \Rightarrow o$ be given. Let $v4_cat_1 : \iota \Rightarrow o$ be given. Let $v5_cat_1 : \iota \Rightarrow o$ be given. Let $v6_cat_1 : \iota \Rightarrow o$ be given. Let $v6_cat_4 : \iota \Rightarrow o$ be given. Let $l2_cat_4 : \iota \Rightarrow o$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $k3_graph_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k22_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k4_graph_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k20_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l1_cat_1 : \iota \Rightarrow o$ be given. Let $u4_struct_0 : \iota \Rightarrow \iota$ be given. Let $k21_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v11_cat_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u5_cat_4 : \iota \Rightarrow \iota$ be given. Let $k2_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u7_cat_4 : \iota \Rightarrow \iota$ be given. Let $u8_cat_4 : \iota \Rightarrow \iota$ be given. Let $r4_cat_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k5_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u6_cat_4 : \iota \Rightarrow \iota$ be given. Let $k2_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0.(l2_cat_4 X0) \Rightarrow (l1_cat_1 X0) \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 \\ & X0) \wedge (l2_cat_4 X0))) \wedge ((m1_subset_1 X1 (u1_struct_0 X0)) \wedge (m1_subset_1 \\ & X2 (u1_struct_0 X0)))) \Rightarrow (m1_subset_1 (k22_cat_4 X0 X1 X2) (u4_struct_0 \\ & X0)) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 \\ & X0) \wedge (l2_cat_4 X0))) \wedge ((m1_subset_1 X1 (u1_struct_0 X0)) \wedge (m1_subset_1 \\ & X2 (u1_struct_0 X0)))) \Rightarrow (m1_subset_1 (k21_cat_4 X0 X1 X2) (u4_struct_0 \\ & X0)) \end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 \\ & X0) \wedge (l2_cat_4 X0))) \wedge ((m1_subset_1 X1 (u1_struct_0 X0)) \wedge (m1_subset_1 \\ & X2 (u1_struct_0 X0))) \Rightarrow (m1_subset_1 (k20_cat_4 X0 X1 X2) (u1_struct_0 \\ & X0)) \end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\ & X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\ & X0) \wedge (l2_cat_4 X0))))))) \Rightarrow ((v6_cat_4 X0) \Leftrightarrow ((v11_cat_1 (u5_cat_4 \\ & X0) X0) \wedge (\forall X1. (m1_subset_1 X1 (u1_struct_0 X0)) \Rightarrow (\forall X2. \\ & (m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow ((k3_graph_1 X0 (k2_binop_1 \\ & (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u7_cat_4 X0) \\ & X1 X2) = X1) \wedge ((k3_graph_1 X0 (k2_binop_1 (u1_struct_0 X0) (u1_struct_0 \\ & X0) (u4_struct_0 X0) (u8_cat_4 X0) X1 X2) = X2) \wedge (r4_cat_3 X0 (k5_binop_1 \\ & (u1_struct_0 X0) (u6_cat_4 X0) X1 X2) (k2_binop_1 (u1_struct_0 \\ & X0) (u1_struct_0 X0) (u4_struct_0 X0) (u7_cat_4 X0) X1 X2) (k2_binop_1 \\ & (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u8_cat_4 X0) \\ & X1 X2)))))))))) \end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 X0) \wedge (l2_cat_4 \\ & X0)) \Rightarrow (\forall X1. (m1_subset_1 X1 (u1_struct_0 X0)) \Rightarrow (\forall X2. \\ & (m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow (k22_cat_4 X0 X1 X2 = k2_binop_1 \\ & (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u8_cat_4 X0) \\ & X1 X2))) \end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 X0) \wedge (l2_cat_4 \\ & X0)) \Rightarrow (\forall X1. (m1_subset_1 X1 (u1_struct_0 X0)) \Rightarrow (\forall X2. \\ & (m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow (k21_cat_4 X0 X1 X2 = k2_binop_1 \\ & (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u7_cat_4 X0) \\ & X1 X2))) \end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 X0) \wedge (l2_cat_4 \\ & X0)) \Rightarrow (\forall X1. (m1_subset_1 X1 (u1_struct_0 X0)) \Rightarrow (\forall X2. \\ & (m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow (k20_cat_4 X0 X1 X2 = k5_binop_1 \\ & (u1_struct_0 X0) (u6_cat_4 X0) X1 X2))) \end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))) \Rightarrow (\forall X1.(m1_subset_1 X1 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u4_struct_0 X0)) \Rightarrow (\forall X3. \\
& (m1_subset_1 X3 (u4_struct_0 X0)) \Rightarrow ((r4_cat_3 X0 X1 X2 X3) \Leftrightarrow ((k4_graph_1 \\
& X0 X2 = X1) \wedge ((k4_graph_1 X0 X3 = X1) \wedge (\forall X4.(m1_subset_1 X4 \\
& (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_subset_1 X5 (u4_struct_0 X0)) \Rightarrow \\
& (\forall X6.(m1_subset_1 X6 (u4_struct_0 X0)) \Rightarrow (\neg(X5 \in k2_cat_1 \\
& X0 (k3_graph_1 X0 X2) X4) \wedge ((X6 \in k2_cat_1 X0 (k3_graph_1 X0 X3) X4) \wedge \\
& (\forall X7.(m1_subset_1 X7 (u4_struct_0 X0)) \Rightarrow (\neg(X7 \in k2_cat_1 \\
& X0 X1 X4) \wedge (\forall X8.(m1_subset_1 X8 (u4_struct_0 X0)) \Rightarrow ((X8 \in \\
& k2_cat_1 X0 X1 X4) \Rightarrow (((k1_cat_1 X0 X2 X8 = X5) \wedge (k1_cat_1 X0 X3 X8 = X6)) \Leftrightarrow \\
& (X7 = X8))))))))))))))
\end{aligned} \tag{9}$$

Theorem 1

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge ((v6_cat_4 X0) \wedge (l2_cat_4 X0)))))) \Rightarrow (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow ((k3_graph_1 X0 (k22_cat_4 X0 X1 X2) = X2) \wedge (k4_graph_1 X0 (\\
& k22_cat_4 X0 X1 X2) = k20_cat_4 X0 X1 X2)))
\end{aligned}$$