

t39_cat_2 (TMURLviKtMEHp- sxy1bdx5XaqRLNRTzSDPsx)

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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 $l1_cat_1 : \iota \Rightarrow o$ be given. Let $m2_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k8_cat_2 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $k3_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k7_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k13_cat_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u4_struct_0 : \iota \Rightarrow \iota$ be given. Let $k4_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k8_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k11_cat_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k12_cat_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m1_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0))))))) \Rightarrow (\forall X1.((\neg v2_struct_0 X1) \wedge ((\\
& \neg v11_struct_0 X1) \wedge ((v2_cat_1 X1) \wedge ((v3_cat_1 X1) \wedge ((v4_cat_1 \\
& X1) \wedge ((v5_cat_1 X1) \wedge ((v6_cat_1 X1) \wedge (l1_cat_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2_cat_1 X2 X0 X1) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow \\
& (k3_funct_2 (u4_struct_0 X0) (u4_struct_0 X1) X2 (k4_cat_1 X0 X3) = \\
& k4_cat_1 X1 (k8_cat_1 X0 X1 X2 X3))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0))))))) \Rightarrow (\forall X1.((\neg v2_struct_0 X1) \wedge ((\\
& \neg v11_struct_0 X1) \wedge ((v2_cat_1 X1) \wedge ((v3_cat_1 X1) \wedge ((v4_cat_1 \\
& X1) \wedge ((v5_cat_1 X1) \wedge ((v6_cat_1 X1) \wedge (l1_cat_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2_cat_1 X2 X0 X1) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow \\
& (\forall X4.(m1_subset_1 X4 (u1_struct_0 X1)) \Rightarrow ((k3_funct_2 (\\
& u4_struct_0 X0) (u4_struct_0 X1) X2 (k4_cat_1 X0 X3) = k4_cat_1 X1 \\
& X4) \Rightarrow (k8_cat_1 X0 X1 X2 X3 = X4))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2_struct_0 X1) \wedge ((\\
& \neg v11_struct_0 X1) \wedge ((v2_cat_1 X1) \wedge ((v3_cat_1 X1) \wedge ((v4_cat_1 \\
& X1) \wedge ((v5_cat_1 X1) \wedge ((v6_cat_1 X1) \wedge (l1_cat_1 X1)))))))) \Rightarrow (\forall X2. \\
& ((\neg v2_struct_0 X2) \wedge ((\neg v11_struct_0 X2) \wedge ((v2_cat_1 X2) \wedge ((v3_cat_1 \\
& X2) \wedge ((v4_cat_1 X2) \wedge ((v5_cat_1 X2) \wedge ((v6_cat_1 X2) \wedge (l1_cat_1 \\
& X2)))))))) \Rightarrow (\forall X3.(m2_cat_1 X3 (k8_cat_2 X0 X1) X2) \Rightarrow (\forall X4. \\
& (m1_subset_1 X4 (u1_struct_0 X1)) \Rightarrow (\forall X5.(m1_subset_1 X5 \\
& (u4_struct_0 X0)) \Rightarrow (k3_funct_2 (u4_struct_0 X0) (u4_struct_0 \\
& X2) (k13_cat_2 X0 X1 X2 X3 X4) X5 = k11_cat_2 X0 X1 X2 X3 X5 (k4_cat_1 \\
& X1 X4))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2_struct_0 X1) \wedge ((\\
& \neg v11_struct_0 X1) \wedge ((v2_cat_1 X1) \wedge ((v3_cat_1 X1) \wedge ((v4_cat_1 \\
& X1) \wedge ((v5_cat_1 X1) \wedge ((v6_cat_1 X1) \wedge (l1_cat_1 X1)))))))) \Rightarrow (\forall X2. \\
& ((\neg v2_struct_0 X2) \wedge ((\neg v11_struct_0 X2) \wedge ((v2_cat_1 X2) \wedge ((v3_cat_1 \\
& X2) \wedge ((v4_cat_1 X2) \wedge ((v5_cat_1 X2) \wedge ((v6_cat_1 X2) \wedge (l1_cat_1 \\
& X2)))))))) \Rightarrow (\forall X3.(m2_cat_1 X3 (k8_cat_2 X0 X1) X2) \Rightarrow (\forall X4. \\
& (m1_subset_1 X4 (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_subset_1 X5 \\
& (u1_struct_0 X1)) \Rightarrow (k3_funct_2 (u1_struct_0 X1) (u1_struct_0 \\
& X2) (k7_cat_1 X1 X2 (k12_cat_2 X0 X1 X2 X3 X4)) X5 = k1_binop_1 (k7_cat_1 \\
& (k8_cat_2 X0 X1) X2 X3) X4 X5))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2_struct_0 X1) \wedge ((\\
& \neg v11_struct_0 X1) \wedge ((v2_cat_1 X1) \wedge ((v3_cat_1 X1) \wedge ((v4_cat_1 \\
& X1) \wedge ((v5_cat_1 X1) \wedge ((v6_cat_1 X1) \wedge (l1_cat_1 X1)))))))) \Rightarrow (\forall X2. \\
& ((\neg v2_struct_0 X2) \wedge ((\neg v11_struct_0 X2) \wedge ((v2_cat_1 X2) \wedge ((v3_cat_1 \\
& X2) \wedge ((v4_cat_1 X2) \wedge ((v5_cat_1 X2) \wedge ((v6_cat_1 X2) \wedge (l1_cat_1 \\
& X2)))))))) \Rightarrow (\forall X3.(m2_cat_1 X3 (k8_cat_2 X0 X1) X2) \Rightarrow (\forall X4. \\
& (m1_subset_1 X4 (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_subset_1 X5 \\
& (u4_struct_0 X1)) \Rightarrow (k3_funct_2 (u4_struct_0 X1) (u4_struct_0 \\
& X2) (k12_cat_2 X0 X1 X2 X3 X4) X5 = k11_cat_2 X0 X1 X2 X3 (k4_cat_1 X0 \\
& X4) X5))))))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge((v2_cat_1 X0)\wedge((v3_cat_1 \\
& X0)\wedge((v4_cat_1 X0)\wedge((v5_cat_1 X0)\wedge((v6_cat_1 X0)\wedge(l1_cat_1 \\
& X0))))))\wedge(((\neg v2_struct_0 X1)\wedge(\neg v11_struct_0 X1)\wedge((v2_cat_1 \\
& X1)\wedge((v3_cat_1 X1)\wedge((v4_cat_1 X1)\wedge((v5_cat_1 X1)\wedge((v6_cat_1 \\
& X1)\wedge(l1_cat_1 X1))))))\wedge(((\neg v2_struct_0 X2)\wedge(\neg v11_struct_0 \\
& X2)\wedge((v2_cat_1 X2)\wedge((v3_cat_1 X2)\wedge((v4_cat_1 X2)\wedge((v5_cat_1 \\
& X2)\wedge((v6_cat_1 X2)\wedge(l1_cat_1 X2))))))\wedge((m2_cat_1 X3 (k8_cat_2 \\
& X0 X1) X2)\wedge((m1_subset_1 X4 (u4_struct_0 X0))\wedge(m1_subset_1 X5 \\
& (u4_struct_0 X1))))))\Rightarrow(k11_cat_2 X0 X1 X2 X3 X4 X5 = k1_binop_1 \\
& X3 X4 X5)
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 \\
& X0)\wedge(l1_cat_1 X0))\wedge((m1_subset_1 X1 (u1_struct_0 X0))\wedge(m1_subset_1 \\
& X2 (u1_struct_0 X0))))\Rightarrow(\forall X3.(m1_cat_1 X3 X0 X1 X2)\Rightarrow(m1_subset_1 \\
& X3 (u4_struct_0 X0)))
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2_struct_0 \\
& X0)\wedge(\neg v11_struct_0 X0)\wedge((v2_cat_1 X0)\wedge((v3_cat_1 X0)\wedge((v4_cat_1 \\
& X0)\wedge((v5_cat_1 X0)\wedge((v6_cat_1 X0)\wedge(l1_cat_1 X0))))))\wedge(((\\
& \neg v2_struct_0 X1)\wedge(\neg v11_struct_0 X1)\wedge((v2_cat_1 X1)\wedge((v3_cat_1 \\
& X1)\wedge((v4_cat_1 X1)\wedge((v5_cat_1 X1)\wedge((v6_cat_1 X1)\wedge(l1_cat_1 \\
& X1))))))\wedge((m2_cat_1 X2 X0 X1)\wedge(m1_subset_1 X3 (u1_struct_0 \\
& X0))))\Rightarrow(m1_subset_1 (k8_cat_1 X0 X1 X2 X3) (u1_struct_0 X1))
\end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge \\
& ((v5_cat_1 X0)\wedge((v6_cat_1 X0)\wedge(l1_cat_1 X0))))\wedge(m1_subset_1 \\
& X1 (u1_struct_0 X0))\Rightarrow(m1_cat_1 (k4_cat_1 X0 X1) X0 X1 X1)
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2_struct_0 \\
& X0)\wedge(\neg v11_struct_0 X0)\wedge((v2_cat_1 X0)\wedge((v3_cat_1 X0)\wedge((v4_cat_1 \\
& X0)\wedge((v5_cat_1 X0)\wedge((v6_cat_1 X0)\wedge(l1_cat_1 X0))))))\wedge(((\\
& \neg v2_struct_0 X1)\wedge(\neg v11_struct_0 X1)\wedge((v2_cat_1 X1)\wedge((v3_cat_1 \\
& X1)\wedge((v4_cat_1 X1)\wedge((v5_cat_1 X1)\wedge((v6_cat_1 X1)\wedge(l1_cat_1 \\
& X1))))))\wedge(((\neg v2_struct_0 X2)\wedge(\neg v11_struct_0 X2)\wedge((v2_cat_1 \\
& X2)\wedge((v3_cat_1 X2)\wedge((v4_cat_1 X2)\wedge((v5_cat_1 X2)\wedge((v6_cat_1 \\
& X2)\wedge(l1_cat_1 X2))))))\wedge((m2_cat_1 X3 (k8_cat_2 X0 X1) X2)\wedge(\\
& m1_subset_1 X4 (u1_struct_0 X1))))\Rightarrow(m2_cat_1 (k13_cat_2 X0 \\
& X1 X2 X3 X4) X0 X2)
\end{aligned} \tag{10}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2_struct_0 \\
& X0)\wedge((\neg v11_struct_0 X0)\wedge((v2_cat_1 X0)\wedge((v3_cat_1 X0)\wedge((v4_cat_1 \\
& X0)\wedge((v5_cat_1 X0)\wedge((v6_cat_1 X0)\wedge(l1_cat_1 X0))))))\wedge(((\\
& \neg v2_struct_0 X1)\wedge((\neg v11_struct_0 X1)\wedge((v2_cat_1 X1)\wedge((v3_cat_1 \\
& X1)\wedge((v4_cat_1 X1)\wedge((v5_cat_1 X1)\wedge((v6_cat_1 X1)\wedge(l1_cat_1 \\
& X1))))))\wedge(((\neg v2_struct_0 X2)\wedge((\neg v11_struct_0 X2)\wedge((v2_cat_1 \\
& X2)\wedge((v3_cat_1 X2)\wedge((v4_cat_1 X2)\wedge((v5_cat_1 X2)\wedge((v6_cat_1 \\
& X2)\wedge(l1_cat_1 X2))))))\wedge((m2_cat_1 X3 (k8_cat_2 X0 X1) X2)\wedge(\\
& m1_subset_1 X4 (u1_struct_0 X0))))))\Rightarrow(m2_cat_1 (k12_cat_2 X0 \\
& X1 X2 X3 X4) X1 X2)
\end{aligned} \tag{11}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge((v2_cat_1 \\
& X0)\wedge((v3_cat_1 X0)\wedge((v4_cat_1 X0)\wedge((v5_cat_1 X0)\wedge((v6_cat_1 \\
& X0)\wedge(l1_cat_1 X0))))))\Rightarrow(\forall X1.((\neg v2_struct_0 X1)\wedge((\\
& \neg v11_struct_0 X1)\wedge((v2_cat_1 X1)\wedge((v3_cat_1 X1)\wedge((v4_cat_1 \\
& X1)\wedge((v5_cat_1 X1)\wedge((v6_cat_1 X1)\wedge(l1_cat_1 X1))))))\Rightarrow(\forall X2. \\
& (m2_cat_1 X2 X0 X1)\Rightarrow(\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)\Rightarrow \\
& (k8_cat_1 X0 X1 X2 X3 = k3_funct_2 (u1_struct_0 X0) (u1_struct_0 \\
& X1) (k7_cat_1 X0 X1 X2) X3))))
\end{aligned} \tag{12}$$

Theorem 1

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge((v2_cat_1 \\
& X0)\wedge((v3_cat_1 X0)\wedge((v4_cat_1 X0)\wedge((v5_cat_1 X0)\wedge((v6_cat_1 \\
& X0)\wedge(l1_cat_1 X0))))))\Rightarrow(\forall X1.((\neg v2_struct_0 X1)\wedge((\\
& \neg v11_struct_0 X1)\wedge((v2_cat_1 X1)\wedge((v3_cat_1 X1)\wedge((v4_cat_1 \\
& X1)\wedge((v5_cat_1 X1)\wedge((v6_cat_1 X1)\wedge(l1_cat_1 X1))))))\Rightarrow(\forall X2. \\
& ((\neg v2_struct_0 X2)\wedge((\neg v11_struct_0 X2)\wedge((v2_cat_1 X2)\wedge((v3_cat_1 \\
& X2)\wedge((v4_cat_1 X2)\wedge((v5_cat_1 X2)\wedge((v6_cat_1 X2)\wedge(l1_cat_1 \\
& X2))))))\Rightarrow(\forall X3.(m2_cat_1 X3 (k8_cat_2 X0 X1) X2)\Rightarrow(\forall X4. \\
& (m1_subset_1 X4 (u1_struct_0 X0)\Rightarrow(\forall X5.(m1_subset_1 X5 \\
& (u1_struct_0 X1)\Rightarrow(k3_funct_2 (u1_struct_0 X0) (u1_struct_0 \\
& X2) (k7_cat_1 X0 X2 (k13_cat_2 X0 X1 X2 X3 X5) X4 = k1_binop_1 (k7_cat_1 \\
& (k8_cat_2 X0 X1) X2 X3) X4 X5))))))
\end{aligned}$$