

t41_cat_4

(TMXnyf8yFxE1LBrckTX2ypwGjczyCxGKwJp)

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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 $v3_cat_4 : \iota \Rightarrow o$ be given. Let $l1_cat_4 : \iota \Rightarrow o$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $m1_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_xboole_0 : \iota$ be given. Let $k5_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k2_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k9_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k18_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l1_cat_1 : \iota \Rightarrow o$ be given. Let $k8_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k7_cat_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
 & X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
 & X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))))) \Rightarrow (\forall X1.(m1_subset_1 \\
 & X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
 & X0)) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\forall X4. \\
 & (m1_subset_1 X4 (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_cat_1 X5 X0 \\
 & X1 X2) \Rightarrow (\forall X6.(m1_cat_1 X6 X0 X1 X3) \Rightarrow (\forall X7.(m1_cat_1 \\
 & X7 X0 X4 X1) \Rightarrow (\neg(k2_cat_1 X0 X1 X2 \neq k1_xboole_0) \wedge ((k2_cat_1 X0 X1 \\
 & X3 \neq k1_xboole_0) \wedge ((k2_cat_1 X0 X4 X1 \neq k1_xboole_0) \wedge (k9_cat_4 \\
 & X0 X2 X3 X4 (k5_cat_1 X0 X4 X1 X2 X7 X5) (k5_cat_1 X0 X4 X1 X3 X7 X6) \neq k5_cat_1 \\
 & X0 X4 X1 (k2_cat_4 X0 X2 X3) X7 (k9_cat_4 X0 X2 X3 X1 X5 X6)))))))))))))
 \end{aligned}$$

(1)

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))))) \Rightarrow (\forall X1.(m1_subset_1 X1 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow (\forall X3. \\
& (m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\forall X4.(m1_subset_1 X4 \\
& (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_cat_1 X5 X0 X1 X2) \Rightarrow (\forall X6. \\
& (m1_cat_1 X6 X0 X2 X3) \Rightarrow (\forall X7.(m1_cat_1 X7 X0 X3 X4) \Rightarrow (\neg(k2_cat_1 \\
& X0 X1 X2 \neq k1_xboole_0) \wedge ((k2_cat_1 X0 X2 X3 \neq k1_xboole_0) \wedge ((k2_cat_1 \\
& X0 X3 X4 \neq k1_xboole_0) \wedge (k5_cat_1 X0 X1 X2 X4 X5 (k5_cat_1 X0 X2 X3 X4 \\
& X6 X7) \neq k5_cat_1 X0 X1 X3 X4 (k5_cat_1 X0 X1 X2 X3 X5 X6) X7))))))))))))) \\
& \tag{2}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))))) \Rightarrow (\forall X1.(m1_subset_1 X1 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow (\forall X3. \\
& (m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\neg(k2_cat_1 X0 X1 X2 \neq k1_xboole_0) \wedge \\
& ((k2_cat_1 X0 X2 X3 \neq k1_xboole_0) \wedge (k2_cat_1 X0 X1 X3 = k1_xboole_0)))))) \\
& \tag{3}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))) \Rightarrow (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\neg(k2_cat_1 \\
& X0 X1 X2 \neq k1_xboole_0) \wedge ((k2_cat_1 X0 X1 X3 \neq k1_xboole_0) \wedge (k2_cat_1 \\
& X0 X1 (k2_cat_4 X0 X2 X3) = k1_xboole_0)))))) \\
& \tag{4}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))) \Rightarrow (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow ((k2_cat_1 X0 (k2_cat_4 X0 X1 X2) X1 \neq k1_xboole_0) \wedge (k2_cat_1 \\
& X0 (k2_cat_4 X0 X1 X2) X2 \neq k1_xboole_0))) \\
& \tag{5}
\end{aligned}$$

Assume the following.

$$\forall X0.(l1_cat_4 X0) \Rightarrow (l1_cat_1 X0) \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge(v2_cat_1 X0)\wedge(v3_cat_1 \\
& X0)\wedge(v4_cat_1 X0)\wedge(v5_cat_1 X0)\wedge(v6_cat_1 X0)\wedge(v3_cat_4 \\
& X0)\wedge(l1_cat_4 X0))))\wedge((m1_subset_1 X1 (u1_struct_0 X0))\wedge \\
& ((m1_subset_1 X2 (u1_struct_0 X0))\wedge(m1_subset_1 X3 (u1_struct_0 \\
& X0))\wedge((m1_cat_1 X4 X0 X3 X1)\wedge(m1_cat_1 X5 X0 X3 X2))))\Rightarrow(m1_cat_1 \\
& (k9_cat_4 X0 X1 X2 X3 X4 X5) X0 X3 (k2_cat_4 X0 X1 X2))
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 \\
& X0)\wedge(v2_cat_1 X0)\wedge(v3_cat_1 X0)\wedge(v4_cat_1 X0)\wedge(v5_cat_1 \\
& X0)\wedge(v6_cat_1 X0)\wedge(v3_cat_4 X0)\wedge(l1_cat_4 X0))))\wedge((\\
& m1_subset_1 X1 (u1_struct_0 X0))\wedge(m1_subset_1 X2 (u1_struct_0 \\
& X0)))\Rightarrow(m1_cat_1 (k8_cat_4 X0 X1 X2) X0 (k2_cat_4 X0 X1 X2) X2)
\end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 \\
& X0)\wedge(v2_cat_1 X0)\wedge(v3_cat_1 X0)\wedge(v4_cat_1 X0)\wedge(v5_cat_1 \\
& X0)\wedge(v6_cat_1 X0)\wedge(v3_cat_4 X0)\wedge(l1_cat_4 X0))))\wedge((\\
& m1_subset_1 X1 (u1_struct_0 X0))\wedge(m1_subset_1 X2 (u1_struct_0 \\
& X0)))\Rightarrow(m1_cat_1 (k7_cat_4 X0 X1 X2) X0 (k2_cat_4 X0 X1 X2) X1)
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge(v2_cat_1 X0)\wedge(v3_cat_1 \\
& X0)\wedge(v4_cat_1 X0)\wedge(v5_cat_1 X0)\wedge(v6_cat_1 X0)\wedge(l1_cat_1 \\
& X0))))\wedge((m1_subset_1 X1 (u1_struct_0 X0))\wedge(m1_subset_1 \\
& X2 (u1_struct_0 X0))\wedge((m1_subset_1 X3 (u1_struct_0 X0))\wedge((m1_cat_1 \\
& X4 X0 X1 X2)\wedge(m1_cat_1 X5 X0 X2 X3))))\Rightarrow(m1_cat_1 (k5_cat_1 X0 X1 \\
& X2 X3 X4 X5) X0 X1 X3)
\end{aligned} \tag{10}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 \\
& X0)\wedge(l1_cat_4 X0))\wedge((m1_subset_1 X1 (u1_struct_0 X0))\wedge(m1_subset_1 \\
& X2 (u1_struct_0 X0))))\Rightarrow(m1_subset_1 (k2_cat_4 X0 X1 X2) (u1_struct_0 \\
& X0))
\end{aligned} \tag{11}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))))) \Rightarrow (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\forall X4. \\
& (m1_subset_1 X4 (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_cat_1 X5 X0 \\
& X1 X2) \Rightarrow (\forall X6.(m1_cat_1 X6 X0 X3 X4) \Rightarrow (k18_cat_4 X0 X1 X2 X3 X4 \\
& X5 X6 = k9_cat_4 X0 X2 X4 (k2_cat_4 X0 X1 X3) (k5_cat_1 X0 (k2_cat_4 \\
& X0 X1 X3) X1 X2 (k7_cat_4 X0 X1 X3) X5) (k5_cat_1 X0 (k2_cat_4 X0 X1 X3) \\
& X3 X4 (k8_cat_4 X0 X1 X3) X6))))))))))
\end{aligned} \tag{12}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))))) \Rightarrow (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\forall X4. \\
& (m1_cat_1 X4 X0 X3 X1) \Rightarrow (\forall X5.(m1_cat_1 X5 X0 X3 X2) \Rightarrow (\neg(k2_cat_1 \\
& X0 X3 X1 \neq k1_xboole_0) \wedge ((k2_cat_1 X0 X3 X2 \neq k1_xboole_0) \wedge (\neg \forall X6. \\
& (m1_cat_1 X6 X0 X3 (k2_cat_4 X0 X1 X2)) \Rightarrow ((X6 = k9_cat_4 X0 X1 X2 X3 X4 \\
& X5) \Leftrightarrow ((k5_cat_1 X0 X3 (k2_cat_4 X0 X1 X2) X1 X6 (k7_cat_4 X0 X1 X2) = \\
& X4) \wedge (k5_cat_1 X0 X3 (k2_cat_4 X0 X1 X2) X2 X6 (k8_cat_4 X0 X1 X2) = X5))))))))))
\end{aligned} \tag{13}$$

Theorem 1

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))))) \Rightarrow (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)) \Rightarrow (\forall X4. \\
& (m1_subset_1 X4 (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_subset_1 X5 \\
& (u1_struct_0 X0)) \Rightarrow (\forall X6.(m1_cat_1 X6 X0 X1 X2) \Rightarrow (\forall X7. \\
& (m1_cat_1 X7 X0 X3 X4) \Rightarrow (\forall X8.(m1_cat_1 X8 X0 X5 X1) \Rightarrow (\forall X9. \\
& (m1_cat_1 X9 X0 X5 X3) \Rightarrow (\neg(k2_cat_1 X0 X1 X2 \neq k1_xboole_0) \wedge ((k2_cat_1 \\
& X0 X3 X4 \neq k1_xboole_0) \wedge ((k2_cat_1 X0 X5 X1 \neq k1_xboole_0) \wedge ((k2_cat_1 \\
& X0 X5 X3 \neq k1_xboole_0) \wedge (k5_cat_1 X0 X5 (k2_cat_4 X0 X1 X3) (k2_cat_4 \\
& X0 X2 X4) (k9_cat_4 X0 X1 X3 X5 X8 X9) (k18_cat_4 X0 X1 X2 X3 X4 X6 X7) \neq \\
& k9_cat_4 X0 X2 X4 X5 (k5_cat_1 X0 X5 X1 X2 X8 X6) (k5_cat_1 X0 X5 X3 X4 \\
& X9 X7))))))))))))))
\end{aligned}$$