

t80_cat_3 (TM-
cMG4r7YU7oWK5P3StzXcUqLRVh45p9vF9)

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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 $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $u4_struct_0 : \iota \Rightarrow \iota$ be given. Let $r4_cat_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k3_graph_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $r1_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r3_cat_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_tarski : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5_funct_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m2_cat_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r2_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_cat_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k4_graph_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $v1_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_zfmisc_1 : \iota \Rightarrow \iota$ be given. Let $k2_zfmisc_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $k4_funct_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Let $k1_xboole_0 : \iota$ be given. Let $l5_struct_0 : \iota \Rightarrow o$ be given. Let $l1_graph_1 : \iota \Rightarrow o$ 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.

$$\begin{aligned}
 & \forall X0. \forall X1. \forall X2. ((\neg v2_struct_0 X2) \wedge ((\neg v11_struct_0 \\
 & X2) \wedge ((v2_cat_1 X2) \wedge ((v3_cat_1 X2) \wedge ((v4_cat_1 X2) \wedge ((v5_cat_1 \\
 & X2) \wedge ((v6_cat_1 X2) \wedge (l1_cat_1 X2))))))) \Rightarrow (\forall X3. (m1_subset_1 \\
 & X3 (u1_struct_0 X2)) \Rightarrow (\forall X4. (m1_subset_1 X4 (u4_struct_0 \\
 & X2)) \Rightarrow (\forall X5. (m1_subset_1 X5 (u4_struct_0 X2)) \Rightarrow ((X0 \neq X1) \Rightarrow \\
 & ((r4_cat_3 X2 X3 X4 X5) \Leftrightarrow (r3_cat_3 X2 X3 (k2_tarski X0 X1) (k5_funct_4 \\
 & (u4_struct_0 X2) X0 X1 X4 X5))))))
 \end{aligned}
 \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.((\neg v2_struct_0 X1)\wedge((\neg v11_struct_0 X1)\wedge \\
& ((v2_cat_1 X1)\wedge((v3_cat_1 X1)\wedge((v4_cat_1 X1)\wedge((v5_cat_1 X1)\wedge \\
& ((v6_cat_1 X1)\wedge(l1_cat_1 X1))))))\Rightarrow(\forall X2.(m1_subset_1 \\
& X2 (u1_struct_0 X1))\Rightarrow(\forall X3.(m1_subset_1 X3 (u1_struct_0 \\
& X1))\Rightarrow(\forall X4.(m2_cat_3 X4 X1 X2 X0)\Rightarrow(\forall X5.(m2_cat_3 \\
& X5 X1 X3 X0)\Rightarrow(((r3_cat_3 X1 X2 X0 X4)\wedge((r3_cat_3 X1 X3 X0 X5)\wedge(r2_funct_2 \\
& X0 (u1_struct_0 X1) (k2_cat_3 X1 X0 X4) (k2_cat_3 X1 X0 X5))))\Rightarrow(r1_cat_1 \\
& X1 X2 X3))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.((\neg v2_struct_0 X2)\wedge((\neg v11_struct_0 \\
& X2)\wedge((v2_cat_1 X2)\wedge((v3_cat_1 X2)\wedge((v4_cat_1 X2)\wedge((v5_cat_1 \\
& X2)\wedge((v6_cat_1 X2)\wedge(l1_cat_1 X2))))))\Rightarrow(\forall X3.(m1_subset_1 \\
& X3 (u4_struct_0 X2))\Rightarrow(\forall X4.(m1_subset_1 X4 (u4_struct_0 \\
& X2))\Rightarrow(r2_funct_2 (k2_tarski X0 X1) (u1_struct_0 X2) (k2_cat_3 \\
& X2 (k2_tarski X0 X1) (k5_funct_4 (u4_struct_0 X2) X0 X1 X3 X4)) (k5_funct_4 \\
& (u1_struct_0 X2) X0 X1 (k3_graph_1 X2 X3) (k3_graph_1 X2 X4))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.((\neg v2_struct_0 X2)\wedge((\neg v11_struct_0 \\
& X2)\wedge((v2_cat_1 X2)\wedge((v3_cat_1 X2)\wedge((v4_cat_1 X2)\wedge((v5_cat_1 \\
& X2)\wedge((v6_cat_1 X2)\wedge(l1_cat_1 X2))))))\Rightarrow(\forall X3.(m1_subset_1 \\
& X3 (u1_struct_0 X2))\Rightarrow(\forall X4.(m1_subset_1 X4 (u4_struct_0 \\
& X2))\Rightarrow(\forall X5.(m1_subset_1 X5 (u4_struct_0 X2))\Rightarrow(((k4_graph_1 \\
& X2 X4 = X3)\wedge(k4_graph_1 X2 X5 = X3))\Rightarrow(m2_cat_3 (k5_funct_4 (u4_struct_0 \\
& X2) X0 X1 X4 X5) X2 X3 (k2_tarski X0 X1))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((v1_funct_1 X2)\wedge \\
& ((v1_funct_2 X2 X0 X1)\wedge(m1_subset_1 X2 (k1_zfmisc_1 (k2_zfmisc_1 \\
& X0 X1))))\wedge((v1_funct_1 X3)\wedge((v1_funct_2 X3 X0 X1)\wedge(m1_subset_1 \\
& X3 (k1_zfmisc_1 (k2_zfmisc_1 X0 X1))))))\Rightarrow((r2_funct_2 X0 X1 X2 \\
& X3)\Leftrightarrow(X2 = X3))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1_xboole_0 \\
& X0)\wedge((m1_subset_1 X3 X0)\wedge(m1_subset_1 X4 X0))\Rightarrow(k5_funct_4 X0 \\
& X1 X2 X3 X4 = k4_funct_4 X1 X2 X3 X4)
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0)\wedge(l1_struct_0 X0))\Rightarrow(\neg v1_xboole_0 \\
& (u1_struct_0 X0))
\end{aligned} \tag{7}$$

Assume the following.

$$v1_xboole_0 \ k1_xboole_0 \quad (8)$$

Assume the following.

$$\forall X0.((\neg v11_struct_0 \ X0) \wedge (l5_struct_0 \ X0)) \Rightarrow (\neg v1_xboole_0 \ (u4_struct_0 \ X0)) \quad (9)$$

Assume the following.

$$\forall X0.(l5_struct_0 \ X0) \Rightarrow (l1_struct_0 \ X0) \quad (10)$$

Assume the following.

$$\forall X0.(l1_graph_1 \ X0) \Rightarrow (l5_struct_0 \ X0) \quad (11)$$

Assume the following.

$$\forall X0.(l1_cat_1 \ X0) \Rightarrow (l1_graph_1 \ X0) \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. ((\neg v1_xboole_0 \\ & X0) \wedge ((m1_subset_1 \ X3 \ X0) \wedge (m1_subset_1 \ X4 \ X0))) \Rightarrow ((v1_funct_1 \\ & (k5_funct_4 \ X0 \ X1 \ X2 \ X3 \ X4)) \wedge ((v1_funct_2 \ (k5_funct_4 \ X0 \ X1 \ X2 \ X3 \\ & X4) \ (k2_tarski \ X1 \ X2) \ X0) \wedge (m1_subset_1 \ (k5_funct_4 \ X0 \ X1 \ X2 \ X3 \ X4) \\ & (k1_zfmisc_1 \ (k2_zfmisc_1 \ (k2_tarski \ X1 \ X2) \ X0)))))) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2_struct_0 \ X0) \wedge ((\neg v11_struct_0 \ X0) \wedge \\ & (l1_graph_1 \ X0))) \wedge (m1_subset_1 \ X1 \ (u4_struct_0 \ X0))) \Rightarrow (m1_subset_1 \\ & (k3_graph_1 \ X0 \ X1) \ (u1_struct_0 \ X0)) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2_struct_0 \ X0) \wedge ((\neg v11_struct_0 \\ & X0) \wedge ((v2_cat_1 \ X0) \wedge ((v3_cat_1 \ X0) \wedge ((v4_cat_1 \ X0) \wedge ((v5_cat_1 \\ & X0) \wedge ((v6_cat_1 \ X0) \wedge (l1_cat_1 \ X0)))))))))) \wedge ((v1_funct_1 \ X2) \wedge \\ & (v1_funct_2 \ X2 \ X1 \ (u4_struct_0 \ X0)) \wedge (m1_subset_1 \ X2 \ (k1_zfmisc_1 \\ & (k2_zfmisc_1 \ X1 \ (u4_struct_0 \ X0)))))) \Rightarrow ((v1_funct_1 \ (k2_cat_3 \\ & X0 \ X1 \ X2)) \wedge ((v1_funct_2 \ (k2_cat_3 \ X0 \ X1 \ X2) \ X1 \ (u1_struct_0 \ X0)) \wedge \\ & (m1_subset_1 \ (k2_cat_3 \ X0 \ X1 \ X2) \ (k1_zfmisc_1 \ (k2_zfmisc_1 \ X1 \ (\\ & u1_struct_0 \ X0)))))) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))) \Rightarrow (\forall X1.(m1_subset_1 X1 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u4_struct_0 X0)) \Rightarrow (\forall X3. \\
& (m1_subset_1 X3 (u4_struct_0 X0)) \Rightarrow ((r4_cat_3 X0 X1 X2 X3) \Leftrightarrow ((k4_graph_1 \\
& X0 X2 = X1) \wedge ((k4_graph_1 X0 X3 = X1) \wedge (\forall X4.(m1_subset_1 X4 \\
& (u1_struct_0 X0)) \Rightarrow (\forall X5.(m1_subset_1 X5 (u4_struct_0 X0)) \Rightarrow \\
& (\forall X6.(m1_subset_1 X6 (u4_struct_0 X0)) \Rightarrow (\neg(X5 \in k2_cat_1 \\
& X0 (k3_graph_1 X0 X2) X4) \wedge ((X6 \in k2_cat_1 X0 (k3_graph_1 X0 X3) X4) \wedge \\
& (\forall X7.(m1_subset_1 X7 (u4_struct_0 X0)) \Rightarrow (\neg(X7 \in k2_cat_1 \\
& X0 X1 X4) \wedge (\forall X8.(m1_subset_1 X8 (u4_struct_0 X0)) \Rightarrow ((X8 \in \\
& k2_cat_1 X0 X1 X4) \Rightarrow (((k1_cat_1 X0 X2 X8 = X5) \wedge (k1_cat_1 X0 X3 X8 = X6)) \Leftrightarrow \\
& (X7 = X8)))))))))))))
\end{aligned} \tag{16}$$

Theorem 1

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))) \Rightarrow (\forall X1.(m1_subset_1 X1 (u1_struct_0 \\
& X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow (\forall X3. \\
& (m1_subset_1 X3 (u4_struct_0 X0)) \Rightarrow (\forall X4.(m1_subset_1 X4 \\
& (u4_struct_0 X0)) \Rightarrow (\forall X5.(m1_subset_1 X5 (u4_struct_0 X0)) \Rightarrow \\
& (\forall X6.(m1_subset_1 X6 (u4_struct_0 X0)) \Rightarrow (((r4_cat_3 X0 \\
& X1 X3 X4) \wedge ((r4_cat_3 X0 X2 X5 X6) \wedge ((k3_graph_1 X0 X3 = k3_graph_1 \\
& X0 X5) \wedge (k3_graph_1 X0 X4 = k3_graph_1 X0 X6)))) \Rightarrow (r1_cat_1 X0 X1 X2)))))))))
\end{aligned}$$