

## t48\_cat\_4

(TMUhhq74jWggaXJzqqa4YYQGgs8zARy8EafG)

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Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k23\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  be given. Let  $k3\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  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  $g2\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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  $v5\_cat\_4 : \iota \Rightarrow o$  be given. Let  $k1\_tarski : \iota \Rightarrow \iota$  be given. Let  $l2\_cat\_4 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $k1\_algstr\_1 : \iota \Rightarrow \iota$  be given. Let  $k18\_funcop\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k17\_funcop\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u2\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $u5\_cat\_4 : \iota \Rightarrow \iota$  be given. Let  $u6\_cat\_4 : \iota \Rightarrow \iota$  be given. Let  $u7\_cat\_4 : \iota \Rightarrow \iota$  be given. Let  $u8\_cat\_4 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall X0. \forall X1. (m1\_subset\_1 X0 X1) \Rightarrow ((v1\_xboole\_0 X1) \vee (X0 \in X1)) \quad (1)$$

Assume the following.

$$\forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_graph\_1 X0))) \wedge (m1\_subset\_1 X1 (u4\_struct\_0 X0))) \Rightarrow (k3\_graph\_1 X0 X1 = k1\_graph\_1 X0 X1) \quad (2)$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& \quad \forall X6.\forall X7.\forall X8.(((v1\_funct\_1 X2)\wedge((v1\_funct\_2 \\
& \quad X2 X1 X0)\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0))))))\wedge \\
& \quad (((v1\_funct\_1 X3)\wedge((v1\_funct\_2 X3 X1 X0)\wedge(m1\_subset\_1 X3 (k1\_zfmisc\_1 \\
& \quad (k2\_zfmisc\_1 X1 X0))))))\wedge(((v1\_funct\_1 X4)\wedge(m1\_subset\_1 X4 (k1\_zfmisc\_1 \\
& \quad (k2\_zfmisc\_1 (k2\_zfmisc\_1 X1 X1) X1))))\wedge((m1\_subset\_1 X5 X0)\wedge \\
& \quad ((v1\_funct\_1 X6)\wedge((v1\_funct\_2 X6 (k2\_zfmisc\_1 X0 X0) X0)\wedge(m1\_subset\_1 \\
& \quad X6 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X0 X0) X0))))))\wedge(((v1\_funct\_1 \\
& \quad X7)\wedge((v1\_funct\_2 X7 (k2\_zfmisc\_1 X0 X0) X1)\wedge(m1\_subset\_1 X7 (k1\_zfmisc\_1 \\
& \quad (k2\_zfmisc\_1 (k2\_zfmisc\_1 X0 X0) X1))))))\wedge((v1\_funct\_1 X8)\wedge(( \\
& \quad v1\_funct\_2 X8 (k2\_zfmisc\_1 X0 X0) X1)\wedge(m1\_subset\_1 X8 (k1\_zfmisc\_1 \\
& \quad (k2\_zfmisc\_1 (k2\_zfmisc\_1 X0 X0) X1))))))\Rightarrow(\forall X9.\forall X10. \\
& \quad \forall X11.\forall X12.\forall X13.\forall X14.\forall X15. \\
& \quad \forall X16.\forall X17.(g2\_cat\_4 X0 X1 X2 X3 X4 X5 X6 X7 X8 = g2\_cat\_4 \\
& \quad X9 X10 X11 X12 X13 X14 X15 X16 X17)\Rightarrow((X0 = X9)\wedge((X1 = X10)\wedge((X2 = X11)\wedge \\
& \quad ((X3 = X12)\wedge((X4 = X13)\wedge((X5 = X14)\wedge((X6 = X15)\wedge((X7 = X16)\wedge(X8 = X17))))))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.(\neg v2\_struct\_0 (k23\_cat\_4 X0 X1))\wedge((\neg v11\_struct\_0 \\
& \quad (k23\_cat\_4 X0 X1))\wedge((v2\_cat\_1 (k23\_cat\_4 X0 X1))\wedge((v3\_cat\_1 ( \\
& \quad k23\_cat\_4 X0 X1))\wedge((v4\_cat\_1 (k23\_cat\_4 X0 X1))\wedge((v5\_cat\_1 (k23\_cat\_4 \\
& \quad X0 X1))\wedge((v6\_cat\_1 (k23\_cat\_4 X0 X1))\wedge(v5\_cat\_4 (k23\_cat\_4 X0 \\
& \quad X1))))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\forall X0.\neg v1\_xboole\_0 (k1\_tarski X0) \tag{5}$$

Assume the following.

$$\forall X0.(l2\_cat\_4 X0)\Rightarrow(l1\_cat\_1 X0) \tag{6}$$

Assume the following.

$$\forall X0.(l1\_cat\_1 X0)\Rightarrow(l1\_graph\_1 X0) \tag{7}$$

Assume the following.

$$\forall X0.\forall X1.(v5\_cat\_4 (k23\_cat\_4 X0 X1))\wedge(l2\_cat\_4 \\
\quad (k23\_cat\_4 X0 X1)) \tag{8}$$

Assume the following.

$$\forall X0.\forall X1.((l1\_graph\_1 X0)\wedge(m1\_subset\_1 X1 (u4\_struct\_0 \\
X0)))\Rightarrow(m1\_subset\_1 (k1\_graph\_1 X0 X1) (u1\_struct\_0 X0)) \tag{9}$$

Assume the following.

$$\forall X0.m1\_subset\_1 (k1\_algstr\_1 X0) (k1\_tarski X0) \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(v1\_funct\_1 (k18\_funcop\_1 X0 X1)) \wedge ((v1\_funct\_2 \\ & (k18\_funcop\_1 X0 X1) (k1\_tarski X0) (k1\_tarski X1)) \wedge (m1\_subset\_1 \\ & (k18\_funcop\_1 X0 X1) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k1\_tarski X0) \\ & (k1\_tarski X1)))))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(v1\_funct\_1 (k17\_funcop\_1 X0 \\ & X1 X2)) \wedge ((v1\_funct\_2 (k17\_funcop\_1 X0 X1 X2) (k2\_zfmisc\_1 (k1\_tarski \\ & X0) (k1\_tarski X1)) (k1\_tarski X2)) \wedge (m1\_subset\_1 (k17\_funcop\_1 \\ & X0 X1 X2) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 (k1\_tarski X0) \\ & (k1\_tarski X1)) (k1\_tarski X2)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_graph\_1 \\ & X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k4\_graph\_1 \\ & X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u2\_graph\_1 \\ & X0) X1)) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\ & X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (k2\_cat\_1 X0 X1 X2 = ReplSep ( \\ & toset (\lambda X3 : \iota.m1\_subset\_1 X3 (u4\_struct\_0 X0))) (\lambda X3 : \\ & \iota.(k3\_graph\_1 X0 X3 = X1) \wedge (k4\_graph\_1 X0 X3 = X2)) (\lambda X3 : \iota. \\ & X3)))) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_graph\_1 \\ & X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k3\_graph\_1 \\ & X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u1\_graph\_1 \\ & X0) X1)) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.k23\_cat\_4 X0 X1 = g2\_cat\_4 (k1\_tarski X0) \\ & (k1\_tarski X1) (k18\_funcop\_1 X1 X0) (k18\_funcop\_1 X1 X0) (k17\_funcop\_1 \\ & X1 X1 X1) (k1\_algstr\_1 X0) (k17\_funcop\_1 X0 X0 X0) (k17\_funcop\_1 \\ & X0 X0 X1) (k17\_funcop\_1 X0 X0 X1) \end{aligned} \quad (16)$$

Assume the following.

$$\forall X0.\forall X1.(X1 = k1\_tarski\ X0) \Leftrightarrow (\forall X2.(X2 \in X1) \Leftrightarrow (X2 = X0)) \quad (17)$$

Assume the following.

$$\forall X0.(l2\_cat\_4\ X0) \Rightarrow ((v5\_cat\_4\ X0) \Rightarrow (X0 = g2\_cat\_4\ (u1\_struct\_0\ X0)\ (u4\_struct\_0\ X0)\ (u1\_graph\_1\ X0)\ (u2\_graph\_1\ X0)\ (u1\_cat\_1\ X0)\ (u5\_cat\_4\ X0)\ (u6\_cat\_4\ X0)\ (u7\_cat\_4\ X0)\ (u8\_cat\_4\ X0))) \quad (18)$$

**Theorem 1**

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ (k23\_cat\_4\ X0\ X1))) \Rightarrow (\forall X3.(m1\_subset\_1\ X3\ (u1\_struct\_0\ (k23\_cat\_4\ X0\ X1))) \Rightarrow (\forall X4.(m1\_subset\_1\ X4\ (u4\_struct\_0\ (k23\_cat\_4\ X0\ X1))) \Rightarrow (X4 \in k2\_cat\_1\ (k23\_cat\_4\ X0\ X1)\ X2\ X3)))$$