

## t25\_cat\_5

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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  $k2\_cat.1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_subset.1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_struct.0 : \iota \Rightarrow \iota$  be given. Let  $k10\_cat.5 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_cat.5 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_zfmisc.1 : \iota \Rightarrow \iota$  be given. Let  $k3\_graph.1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_graph.1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_xboole.0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall X0. \forall X1. \forall X2. ((X0 \in X1) \wedge (m1\_subset.1 X1 (k1\_zfmisc.1 X2))) \Rightarrow (m1\_subset.1 X0 X2) \quad (1)$$

Assume the following.

$$\forall X0. ((\neg v2\_struct.0 X0) \wedge ((\neg v11\_struct.0 X0) \wedge ((v2\_cat.1 X0) \wedge ((v3\_cat.1 X0) \wedge ((v4\_cat.1 X0) \wedge ((v5\_cat.1 X0) \wedge ((v6\_cat.1 X0) \wedge (l1\_cat.1 X0)))))))) \Rightarrow (\forall X1. (m1\_subset.1 X1 (u1\_struct.0 X0)) \Rightarrow (\forall X2. (m1\_subset.1 X2 (u4\_struct.0 X0)) \Rightarrow ((X2 \in k10\_cat.5 X0 X1) \Leftrightarrow (k3\_graph.1 X0 X2 = X1)))) \quad (2)$$

Assume the following.

$$\forall X0. ((\neg v2\_struct.0 X0) \wedge ((\neg v11\_struct.0 X0) \wedge ((v2\_cat.1 X0) \wedge ((v3\_cat.1 X0) \wedge ((v4\_cat.1 X0) \wedge ((v5\_cat.1 X0) \wedge ((v6\_cat.1 X0) \wedge (l1\_cat.1 X0)))))))) \Rightarrow (\forall X1. (m1\_subset.1 X1 (u1\_struct.0 X0)) \Rightarrow (\forall X2. (m1\_subset.1 X2 (u4\_struct.0 X0)) \Rightarrow ((X2 \in k9\_cat.5 X0 X1) \Leftrightarrow (k4\_graph.1 X0 X2 = X1)))) \quad (3)$$

Assume the following.

$$\forall X0. ((\neg v2\_struct.0 X0) \wedge ((\neg v11\_struct.0 X0) \wedge (l1\_cat.1 X0))) \Rightarrow (\forall X1. (m1\_subset.1 X1 (u4\_struct.0 X0)) \Rightarrow (\forall X2. (m1\_subset.1 X2 (u1\_struct.0 X0)) \Rightarrow (\forall X3. (m1\_subset.1 X3 (u1\_struct.0 X0)) \Rightarrow ((X1 \in k2\_cat.1 X0 X2 X3) \Leftrightarrow ((k3\_graph.1 X0 X1 = X2) \wedge (k4\_graph.1 X0 X1 = X3)))))) \quad (4)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1 X2 (k1\_zfmisc\_1 X0))\Rightarrow(k9\_subset\_1 X0 X1 X2 = k3\_xboole\_0 X1 X2) \quad (5)$$

Assume the following.

$$\begin{aligned} &\forall X0.\forall X1.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge \\ &((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge \\ &((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge(m1\_subset\_1 X1 (u1\_struct\_0 \\ &X0))\Rightarrow(m1\_subset\_1 (k9\_cat\_5 X0 X1) (k1\_zfmisc\_1 (u4\_struct\_0 \\ &X0))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} &\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 \\ &X0)\wedge(l1\_cat\_1 X0))\wedge((m1\_subset\_1 X1 (u1\_struct\_0 X0))\wedge(m1\_subset\_1 \\ &X2 (u1\_struct\_0 X0)))\Rightarrow(m1\_subset\_1 (k2\_cat\_1 X0 X1 X2) (k1\_zfmisc\_1 \\ &(u4\_struct\_0 X0))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} &\forall X0.\forall X1.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge \\ &((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge \\ &((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge(m1\_subset\_1 X1 (u1\_struct\_0 \\ &X0))\Rightarrow(m1\_subset\_1 (k10\_cat\_5 X0 X1) (k1\_zfmisc\_1 (u4\_struct\_0 \\ &X0))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} &\forall X0.\forall X1.\forall X2.(X2 = k3\_xboole\_0 X0 X1)\Leftrightarrow(\forall X3. \\ &(X3 \in X2)\Leftrightarrow((X3 \in X0)\wedge(X3 \in X1))) \end{aligned} \quad (9)$$

**Theorem 1**

$$\begin{aligned} &\forall X0.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\ &X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\ &X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ &X0))\Rightarrow(\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0))\Rightarrow(k2\_cat\_1 \\ &X0 X1 X2 = k9\_subset\_1 (u4\_struct\_0 X0) (k10\_cat\_5 X0 X1) (k9\_cat\_5 \\ &X0 X2)))) \end{aligned}$$