

## t12\_cat\_1

(TMYmR3VMHMkmB8xZ9rKugP7utKJe3oD3hGp)

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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  $k3\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_1 : \iota \Rightarrow o$  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  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v7\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v15\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_cat\_1 : \iota \Rightarrow o$  be given. Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (m1\_cat\_1 X1 X0 (k3\_graph\_1 X0 X1) (k4\_graph\_1 X0 X1))) \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 \\ & (u1\_struct\_0 X0)) \Rightarrow ((X1 \in k2\_cat\_1 X0 X2 X3) \Leftrightarrow ((k3\_graph\_1 X0 X1 = \\ & X2) \wedge (k4\_graph\_1 X0 X1 = X3)))))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (m1\_subset\_1 X2 (u1\_struct\_0 \\ & (k3\_cat\_1 X0 X1))) \Rightarrow (\forall X3. (m1\_subset\_1 X3 (u1\_struct\_0 ( \\ & k3\_cat\_1 X0 X1))) \Rightarrow (\forall X4. (m1\_subset\_1 X4 (u4\_struct\_0 (k3\_cat\_1 \\ & X0 X1))) \Rightarrow (X4 \in k2\_cat\_1 (k3\_cat\_1 X0 X1) X2 X3))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (\neg v2\_struct\_0 (k3\_cat\_1 X0 X1)) \wedge ((v7\_struct\_0 \\ & (k3\_cat\_1 X0 X1)) \wedge ((\neg v11\_struct\_0 (k3\_cat\_1 X0 X1)) \wedge ((v15\_struct\_0 \\ & (k3\_cat\_1 X0 X1)) \wedge (v1\_cat\_1 (k3\_cat\_1 X0 X1)))) \end{aligned} \quad (4)$$

Assume the following.

$$\forall X0. \forall X1. (v1\_cat\_1 (k3\_cat\_1 X0 X1)) \wedge (l1\_cat\_1 (k3\_cat\_1 X0 X1)) \quad (5)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\ & (k3\_cat\_1 X0 X1)))\Rightarrow(\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 ( \\ & k3\_cat\_1 X0 X1)))\Rightarrow(\forall X4.(m1\_subset\_1 X4 (u4\_struct\_0 (k3\_cat\_1 \\ & X0 X1)))\Rightarrow(m1\_cat\_1 X4 (k3\_cat\_1 X0 X1) X2 X3))) \end{aligned}$$