t8_cat_4 (TMSwppt-gyX6MUAf6KioyrZGi7UQtx2rMWVJ)

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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 $k5\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v10\_cat\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u4\_struct\_0 : \iota \Rightarrow \iota$ be given. 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 $v9\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k4\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v2\_cat\_4 : \iota \Rightarrow o$ be given. Let $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l1\_cat\_4 : \iota \Rightarrow o$ be given. Let $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1\_xboole\_0 : \iota$ be given. Let $k5\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1\ X2\ (u4\_struct\_0\ (k5\_cat\_4\ X0\ X1))) \Rightarrow (\forall X3.(m1\_subset\_1\ X3\ (u4\_struct\_0\ (k5\_cat\_4\ X0\ X1))) \Rightarrow (X2 = X3)) \tag{1}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0) \wedge ((\neg v11\_struct\_0\ X0) \wedge ((v2\_cat\_1\ X0) \wedge ((v3\_cat\_1\ X0) \wedge ((v4\_cat\_1\ X0) \wedge ((v5\_cat\_1\ X0) \wedge ((v6\_cat\_1\ X0) \wedge (l1\_cat\_1\ X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0)) \Rightarrow (v9\_cat\_1\ (k4\_cat\_1\ X0\ X1)\ X0\ X1\ X1)) \tag{2}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ (k5\_cat\_4\ X0\ X1))) \Rightarrow (\forall X3.(m1\_subset\_1\ X3\ (u1\_struct\_0\ (k5\_cat\_4\ X0\ X1))) \Rightarrow (X2 = X3)) \tag{3}$$

Assume the following.

$$\forall X0.\forall X1.(\neg v2\_struct\_0\ (k5\_cat\_4\ X0\ X1)) \wedge ((\neg v11\_struct\_0\ (k5\_cat\_4\ X0\ X1)) \wedge ((v2\_cat\_1\ (k5\_cat\_4\ X0\ X1)) \wedge ((v3\_cat\_1\ (k5\_cat\_4\ X0\ X1)) \wedge ((v4\_cat\_1\ (k5\_cat\_4\ X0\ X1)) \wedge ((v5\_cat\_1\ (k5\_cat\_4\ X0\ X1)) \wedge ((v6\_cat\_1\ (k5\_cat\_4\ X0\ X1)) \wedge (v2\_cat\_4\ (k5\_cat\_4\ X0\ X1)))))))) \tag{4}$$

Assume the following.

$$\forall X0.\exists X1.m1\_subset\_1\ X1\ X0 \tag{5}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge(l1\_cat\_1\ X0)))\wedge((m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\wedge(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))))\Rightarrow(\forall X3.(m1\_cat\_1\ X3\ X0\ X1\ X2)\Rightarrow(m1\_subset\_1\ X3\ (u4\_struct\_0\ X0))) \tag{6}$$

Assume the following.

$$\forall X0.(l1\_cat\_4\ X0)\Rightarrow(l1\_cat\_1\ X0) \tag{7}$$

Assume the following.

$$\forall X0.\forall X1.(v2\_cat\_4\ (k5\_cat\_4\ X0\ X1))\wedge(l1\_cat\_4\ (k5\_cat\_4\ X0\ X1)) \tag{8}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))\wedge(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0)))\Rightarrow(m1\_cat\_1\ (k4\_cat\_1\ X0\ X1)\ X0\ X1\ X1) \tag{9}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\Rightarrow((v10\_cat\_1\ X1\ X0)\Leftrightarrow(\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))\Rightarrow((k2\_cat\_1\ X0\ X2\ X1\neq k1\_xboole\_0)\wedge(\exists X3.(m1\_cat\_1\ X3\ X0\ X2\ X1)\wedge(\forall X4.(m1\_cat\_1\ X4\ X0\ X2\ X1)\Rightarrow(X3 = X4))))))) \tag{10}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\Rightarrow(\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))\Rightarrow(\forall X3.(m1\_cat\_1\ X3\ X0\ X1\ X2)\Rightarrow((v9\_cat\_1\ X3\ X0\ X1\ X2)\Leftrightarrow((k2\_cat\_1\ X0\ X1\ X2\neq k1\_xboole\_0)\wedge((k2\_cat\_1\ X0\ X2\ X1\neq k1\_xboole\_0)\wedge(\exists X4.(m1\_cat\_1\ X4\ X0\ X2\ X1)\wedge((k5\_cat\_1\ X0\ X2\ X1\ X2\ X4\ X3 = k4\_cat\_1\ X0\ X2)\wedge(k5\_cat\_1\ X0\ X1\ X2\ X1\ X3\ X4 = k4\_cat\_1\ X0\ X1)))))))))) \tag{11}$$

Theorem 1

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ (k5\_cat\_4\ X0\ X1)))\Rightarrow(v10\_cat\_1\ X2\ (k5\_cat\_4\ X0\ X1))$$