t12_cat_3 (TMX8cUgDePxnbCyjJLZ4h4v8j9mvherbQ1T)

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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 $u4\_struct\_0 : \iota \Rightarrow \iota$ be given. Let $k2\_oppcat\_1 : \iota \Rightarrow \iota$ be given. Let $r2\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5\_funct\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k6\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ 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 $k4\_funct\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $g1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v1\_cat\_1 : \iota \Rightarrow o$ be given. Let $l5\_struct\_0 : \iota \Rightarrow o$ be given. Let $l1\_graph\_1 : \iota \Rightarrow o$ be given. Let $u2\_graph\_1 : \iota \Rightarrow \iota$ be given. Let $u1\_struct\_0 : \iota \Rightarrow \iota$ be given. Let $u1\_graph\_1 : \iota \Rightarrow \iota$ be given. Let $u1\_cat\_1 : \iota \Rightarrow \iota$ be given. Let $v1\_relat\_1 : \iota \Rightarrow o$ be given. Let $v5\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k7\_partfun1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.(((v1\_funct\_1\ X2)\wedge ((v1\_funct\_2\ X2\ X0\ X1)\wedge(m1\_subset\_1\ X2\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X0\ X1)))))\wedge((v1\_funct\_1\ X3)\wedge((v1\_funct\_2\ X3\ X0\ X1)\wedge(m1\_subset\_1\ X3\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X0\ X1))))))\Rightarrow((r2\_funct\_2\ X0\ X1\ X2\ X3)\Leftrightarrow(X2 = X3)) \tag{1}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1\_xboole\_0\ X0)\wedge((m1\_subset\_1\ X3\ X0)\wedge(m1\_subset\_1\ X4\ X0)))\Rightarrow(k5\_funct\_4\ X0\ X1\ X2\ X3\ X4 = k4\_funct\_4\ X1\ X2\ X3\ X4) \tag{2}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((v1\_funct\_1\ X2)\wedge((v1\_funct\_2\ X2\ X1\ X0)\wedge(m1\_subset\_1\ X2\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ X0)))))\wedge(((v1\_funct\_1\ X3)\wedge((v1\_funct\_2\ X3\ X1\ X0)\wedge(m1\_subset\_1\ X3\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ X0)))))\wedge((v1\_funct\_1\ X4)\wedge(m1\_subset\_1\ X4\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ X1)\ X1))))))\Rightarrow(\forall X5.\forall X6.\forall X7.\forall X8.\forall X9.(g1\_cat\_1\ X0\ X1\ X2\ X3\ X4 = g1\_cat\_1\ X5\ X6\ X7\ X8\ X9)\Rightarrow((X0 = X5)\wedge((X1 = X6)\wedge((X2 = X7)\wedge((X3 = X8)\wedge(X4 = X9))))))) \tag{3}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow((\neg v2\_struct\_0\ (k2\_oppcat\_1\ X0))\wedge((\neg v11\_struct\_0\ (k2\_oppcat\_1\ X0))\wedge((v1\_cat\_1\ (k2\_oppcat\_1\ X0))\wedge((v2\_cat\_1\ (k2\_oppcat\_1\ X0))\wedge((v3\_cat\_1\ (k2\_oppcat\_1\ X0))\wedge((v4\_cat\_1\ (k2\_oppcat\_1\ X0))\wedge((v5\_cat\_1\ (k2\_oppcat\_1\ X0))\wedge(v6\_cat\_1\ (k2\_oppcat\_1\ X0)))))))) \tag{4}$$

Assume the following.

$$\forall X0.((\neg v11\_struct\_0\ X0)\wedge(l5\_struct\_0\ X0))\Rightarrow(\neg v1\_xboole\_0\ (u4\_struct\_0\ X0)) \tag{5}$$

Assume the following.

$$\forall X0.(l1\_graph\_1\ X0)\Rightarrow((v1\_funct\_1\ (u2\_graph\_1\ X0))\wedge((v1\_funct\_2\ (u2\_graph\_1\ X0)\ (u4\_struct\_0\ X0)\ (u1\_struct\_0\ X0))\wedge(m1\_subset\_1\ (u2\_graph\_1\ X0)\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (u4\_struct\_0\ X0)\ (u1\_struct\_0\ X0))))) \tag{6}$$

Assume the following.

$$\forall X0.(l1\_graph\_1\ X0)\Rightarrow((v1\_funct\_1\ (u1\_graph\_1\ X0))\wedge((v1\_funct\_2\ (u1\_graph\_1\ X0)\ (u4\_struct\_0\ X0)\ (u1\_struct\_0\ X0))\wedge(m1\_subset\_1\ (u1\_graph\_1\ X0)\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (u4\_struct\_0\ X0)\ (u1\_struct\_0\ X0))))) \tag{7}$$

Assume the following.

$$\forall X0.(l1\_cat\_1\ X0)\Rightarrow((v1\_funct\_1\ (u1\_cat\_1\ X0))\wedge(m1\_subset\_1\ (u1\_cat\_1\ X0)\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (k2\_zfmisc\_1\ (u4\_struct\_0\ X0)\ (u4\_struct\_0\ X0))\ (u4\_struct\_0\ X0))))) \tag{8}$$

Assume the following.

$$\forall X0.(l1\_graph\_1\ X0)\Rightarrow(l5\_struct\_0\ X0) \tag{9}$$

Assume the following.

$$\forall X0.(l1\_cat\_1\ X0)\Rightarrow(l1\_graph\_1\ X0) \tag{10}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_relat\_1\ X1)\wedge((v5\_relat\_1\ X1\ X0)\wedge(v1\_funct\_1\ X1)))\Rightarrow(m1\_subset\_1\ (k7\_partfun1\ X0\ X1\ X2)\ X0) \tag{11}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))))\wedge(m1\_subset\_1\ X1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0))))\Rightarrow(m1\_subset\_1\ (k6\_oppcat\_1\ X0\ X1)\ (u4\_struct\_0\ X0)) \tag{12}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1\_xboole\_0\ X0)\wedge((m1\_subset\_1\ X3\ X0)\wedge(m1\_subset\_1\ X4\ X0)))\Rightarrow((v1\_funct\_1\ (k5\_funct\_4\ X0\ X1\ X2\ X3\ X4))\wedge((v1\_funct\_2\ (k5\_funct\_4\ X0\ X1\ X2\ X3\ X4)\ (k2\_tarski\ X1\ X2)\ X0)\wedge(m1\_subset\_1\ (k5\_funct\_4\ X0\ X1\ X2\ X3\ X4)\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (k2\_tarski\ X1\ X2)\ X0))))) \tag{13}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))))\wedge((v1\_funct\_1\ X2)\wedge((v1\_funct\_2\ X2\ X1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0)))\wedge(m1\_subset\_1\ X2\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0))))))))\Rightarrow((v1\_funct\_1\ (k5\_cat\_3\ X0\ X1\ X2))\wedge((v1\_funct\_2\ (k5\_cat\_3\ X0\ X1\ X2)\ X1\ (u4\_struct\_0\ X0))\wedge(m1\_subset\_1\ (k5\_cat\_3\ X0\ X1\ X2)\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ (u4\_struct\_0\ X0)))))) \tag{14}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow((\neg v2\_struct\_0\ (k2\_oppcat\_1\ X0))\wedge((\neg v11\_struct\_0\ (k2\_oppcat\_1\ X0))\wedge((v1\_cat\_1\ (k2\_oppcat\_1\ X0))\wedge(l1\_cat\_1\ (k2\_oppcat\_1\ X0))))) \tag{15}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0\ X0)\wedge((\neg v1\_xboole\_0\ X1)\wedge((\neg v1\_xboole\_0\ X2)\wedge((v1\_funct\_1\ X3)\wedge(m1\_subset\_1\ X3\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (k2\_zfmisc\_1\ X0\ X1)\ X2)))))))\Rightarrow((v1\_funct\_1\ (k1\_oppcat\_1\ X0\ X1\ X2\ X3))\wedge(m1\_subset\_1\ (k1\_oppcat\_1\ X0\ X1\ X2\ X3)\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ X0)\ X2)))) \tag{16}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0)))\Rightarrow(k6\_oppcat\_1\ X0\ X1 = k5\_oppcat\_1\ (k2\_oppcat\_1\ X0)\ X1)) \tag{17}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (u4\_struct\_0\ X0))\Rightarrow(k5\_oppcat\_1\ X0\ X1 = X1)) \tag{18}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow(\forall X1.\forall X2.((v1\_funct\_1\ X2)\wedge((v1\_funct\_2\ X2\ X1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0)))\wedge(m1\_subset\_1\ X2\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0))))))\Rightarrow(\forall X3.((v1\_funct\_1\ X3)\wedge((v1\_funct\_2\ X3\ X1\ (u4\_struct\_0\ X0))\wedge(m1\_subset\_1\ X3\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X1\ (u4\_struct\_0\ X0))))))\Rightarrow((X3 = k5\_cat\_3\ X0\ X1\ X2)\Leftrightarrow(\forall X4.(X4 \in X1)\Rightarrow(k7\_partfun1\ (u4\_struct\_0\ X0)\ X3\ X4 = k6\_oppcat\_1\ X0\ (k7\_partfun1\ (u4\_struct\_0\ (k2\_oppcat\_1\ X0))\ X2\ X4)))))) \tag{19}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge(l1\_cat\_1\ X0)))))))\Rightarrow(k2\_oppcat\_1\ X0 = g1\_cat\_1\ (u1\_struct\_0\ X0)\ (u4\_struct\_0\ X0)\ (u2\_graph\_1\ X0)\ (u1\_graph\_1\ X0)\ (k1\_oppcat\_1\ (u4\_struct\_0\ X0)\ (u4\_struct\_0\ X0)\ (u4\_struct\_0\ X0)\ (u1\_cat\_1\ X0))) \tag{20}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1\ X2\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X0\ X1)))\Rightarrow((v4\_relat\_1\ X2\ X0)\wedge(v5\_relat\_1\ X2\ X1)) \tag{21}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1\ X2\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1\ X0\ X1)))\Rightarrow(v1\_relat\_1\ X2) \tag{22}$$

Assume the following.

$$\forall X0.(l1\_cat\_1\ X0)\Rightarrow((v1\_cat\_1\ X0)\Rightarrow(X0 = g1\_cat\_1\ (u1\_struct\_0\ X0)\ (u4\_struct\_0\ X0)\ (u1\_graph\_1\ X0)\ (u2\_graph\_1\ X0)\ (u1\_cat\_1\ X0))) \tag{23}$$

Theorem 1

$$\forall X0.\forall X1.\forall X2.((\neg v2\_struct\_0\ X2)\wedge((\neg v11\_struct\_0\ X2)\wedge((v2\_cat\_1\ X2)\wedge((v3\_cat\_1\ X2)\wedge((v4\_cat\_1\ X2)\wedge((v5\_cat\_1\ X2)\wedge((v6\_cat\_1\ X2)\wedge(l1\_cat\_1\ X2))))))))\Rightarrow((X0\neq X1)\Rightarrow(\forall X3.(m1\_subset\_1\ X3\ (u4\_struct\_0\ (k2\_oppcat\_1\ X2)))\Rightarrow(\forall X4.(m1\_subset\_1\ X4\ (u4\_struct\_0\ (k2\_oppcat\_1\ X2)))\Rightarrow(r2\_funct\_2\ (k2\_tarski\ X0\ X1)\ (u4\_struct\_0\ X2)\ (k5\_cat\_3\ X2\ (k2\_tarski\ X0\ X1)\ (k5\_funct\_4\ (u4\_struct\_0\ (k2\_oppcat\_1\ X2))\ X0\ X1\ X3\ X4))\ (k5\_funct\_4\ (u4\_struct\_0\ X2)\ X0\ X1\ (k6\_oppcat\_1\ X2\ X3)\ (k6\_oppcat\_1\ X2\ X4))))))$$