t67_cat_4 (TMYNKm8xDPnsQ4i7EwhTBAuM1noCBhtjrQZ)

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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 $v6\_cat\_4 : \iota \Rightarrow o$ be given. Let $l2\_cat\_4 : \iota \Rightarrow o$ be given. Let $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1\_struct\_0 : \iota \Rightarrow \iota$ be given. Let $k29\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k20\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k27\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k28\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k4\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1\_xboole\_0 : \iota$ be given. Let $l1\_cat\_1 : \iota \Rightarrow o$ be given. Let $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k5\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0) \wedge ((\neg v11\_struct\_0\ X0) \wedge ((v2\_cat\_1\ X0) \wedge ((v3\_cat\_1\ X0) \wedge ((v4\_cat\_1\ X0) \wedge ((v5\_cat\_1\ X0) \wedge ((v6\_cat\_1\ X0) \wedge ((v6\_cat\_4\ X0) \wedge (l2\_cat\_4\ X0)))))))) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0)) \Rightarrow (\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0)) \Rightarrow ((k2\_cat\_1\ X0\ X1\ (k20\_cat\_4\ X0\ X1\ X2) \neq k1\_xboole\_0) \wedge (k2\_cat\_1\ X0\ X2\ (k20\_cat\_4\ X0\ X1\ X2) \neq k1\_xboole\_0)))) \tag{1}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0) \wedge ((\neg v11\_struct\_0\ X0) \wedge ((v2\_cat\_1\ X0) \wedge ((v3\_cat\_1\ X0) \wedge ((v4\_cat\_1\ X0) \wedge ((v5\_cat\_1\ X0) \wedge ((v6\_cat\_1\ X0) \wedge (l1\_cat\_1\ X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0)) \Rightarrow (\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0)) \Rightarrow (\forall X3.(m1\_cat\_1\ X3\ X0\ X1\ X2) \Rightarrow ((k2\_cat\_1\ X0\ X1\ X2 \neq k1\_xboole\_0) \Rightarrow (k5\_cat\_1\ X0\ X1\ X2\ X2\ X3\ (k4\_cat\_1\ X0\ X2) = X3))))) \tag{2}$$

Assume the following.

$$\forall X0.(l2\_cat\_4\ X0) \Rightarrow (l1\_cat\_1\ X0) \tag{3}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0) \wedge ((\neg v11\_struct\_0\ X0) \wedge ((v5\_cat\_1\ X0) \wedge ((v6\_cat\_1\ X0) \wedge (l1\_cat\_1\ X0))))) \wedge (m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))) \Rightarrow (m1\_cat\_1\ (k4\_cat\_1\ X0\ X1)\ X0\ X1\ X1) \tag{4}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge((v6\_cat\_4\ X0)\wedge(l2\_cat\_4\ X0)))))))))\wedge((m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\wedge(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))))\Rightarrow(m1\_cat\_1\ (k28\_cat\_4\ X0\ X1\ X2)\ X0\ X2\ (k20\_cat\_4\ X0\ X1\ X2)) \tag{5}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge((v6\_cat\_4\ X0)\wedge(l2\_cat\_4\ X0)))))))))\wedge((m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\wedge(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))))\Rightarrow(m1\_cat\_1\ (k27\_cat\_4\ X0\ X1\ X2)\ X0\ X1\ (k20\_cat\_4\ X0\ X1\ X2)) \tag{6}$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge(l2\_cat\_4\ X0)))\wedge((m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\wedge(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))))\Rightarrow(m1\_subset\_1\ (k20\_cat\_4\ X0\ X1\ X2)\ (u1\_struct\_0\ X0)) \tag{7}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge((v6\_cat\_4\ X0)\wedge(l2\_cat\_4\ X0)))))))))\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\Rightarrow(\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))\Rightarrow(\forall X3.(m1\_subset\_1\ X3\ (u1\_struct\_0\ X0))\Rightarrow(\forall X4.(m1\_cat\_1\ X4\ X0\ X1\ X3)\Rightarrow(\forall X5.(m1\_cat\_1\ X5\ X0\ X2\ X3)\Rightarrow(\neg(k2\_cat\_1\ X0\ X1\ X3\neq k1\_xboole\_0)\wedge((k2\_cat\_1\ X0\ X2\ X3\neq k1\_xboole\_0)\wedge(\neg\forall X6.(m1\_cat\_1\ X6\ X0\ (k20\_cat\_4\ X0\ X1\ X2)\ X3)\Rightarrow((X6 = k29\_cat\_4\ X0\ X1\ X2\ X3\ X4\ X5)\Leftrightarrow((k5\_cat\_1\ X0\ X1\ (k20\_cat\_4\ X0\ X1\ X2)\ X3\ (k27\_cat\_4\ X0\ X1\ X2)\ X6 = X4)\wedge(k5\_cat\_1\ X0\ X2\ (k20\_cat\_4\ X0\ X1\ X2)\ X3\ (k28\_cat\_4\ X0\ X1\ X2)\ X6 = X5)))))))))) \tag{8}$$

Theorem 1

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge((v2\_cat\_1\ X0)\wedge((v3\_cat\_1\ X0)\wedge((v4\_cat\_1\ X0)\wedge((v5\_cat\_1\ X0)\wedge((v6\_cat\_1\ X0)\wedge((v6\_cat\_4\ X0)\wedge(l2\_cat\_4\ X0)))))))))\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (u1\_struct\_0\ X0))\Rightarrow(\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))\Rightarrow(k29\_cat\_4\ X0\ X1\ X2\ (k20\_cat\_4\ X0\ X1\ X2)\ (k27\_cat\_4\ X0\ X1\ X2)\ (k28\_cat\_4\ X0\ X1\ X2) = k4\_cat\_1\ X0\ (k20\_cat\_4\ X0\ X1\ X2))))$$