

# t10\_cat\_3 (TMRZvYd- HTp1dUuBYWnS4rBHcRrKHDvzocoa)

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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  $v1\_funct.1 : \iota \Rightarrow o$  be given. Let  $v1\_funct.2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u4\_struct.0 : \iota \Rightarrow \iota$  be given. Let  $m1\_subset.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc.1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc.1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_funct.2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_oppcat.1 : \iota \Rightarrow \iota$  be given. Let  $k4\_cat.3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole.0 : \iota \Rightarrow o$  be given. Let  $g1\_cat.1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\ & ((\neg v1\_xboole.0 X1) \wedge (\neg v1\_xboole.0 X3) \wedge (((v1\_funct.1 X4) \wedge ((v1\_funct.2 X4 X0 X1) \wedge (m1\_subset.1 X4 (k1\_zfmisc.1 (k2\_zfmisc.1 X0 X1)))))) \wedge ((v1\_funct.1 X5) \wedge ((v1\_funct.2 X5 X2 X3) \wedge (m1\_subset.1 X5 (k1\_zfmisc.1 (k2\_zfmisc.1 X2 X3)))))) \Rightarrow ((r1\_funct.2 X0 X1 X2 X3 X4 X5) \Leftrightarrow (X4 = X5)) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. (((v1\_funct.1 X2) \wedge ((v1\_funct.2 X2 X1 X0) \wedge (m1\_subset.1 X2 (k1\_zfmisc.1 (k2\_zfmisc.1 X1 X0)))))) \wedge (((v1\_funct.1 X3) \wedge ((v1\_funct.2 X3 X1 X0) \wedge (m1\_subset.1 X3 (k1\_zfmisc.1 (k2\_zfmisc.1 X1 X0)))))) \wedge ((v1\_funct.1 X4) \wedge (m1\_subset.1 X4 (k1\_zfmisc.1 (k2\_zfmisc.1 (k2\_zfmisc.1 X1 X1) X1)))))) \Rightarrow (\forall X5. \\ & \forall X6. \forall X7. \forall X8. \forall X9. (g1\_cat.1 X0 X1 X2 X3 X4 = g1\_cat.1 X5 X6 X7 X8 X9) \Rightarrow ((X0 = X5) \wedge ((X1 = X6) \wedge ((X2 = X7) \wedge ((X3 = X8) \wedge (X4 = X9)))))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} \forall X0. (&(\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (&(\neg v2\_struct\_0 (k2\_oppcat\_1 X0)) \wedge \\ ((\neg v11\_struct\_0 (k2\_oppcat\_1 X0)) \wedge ((v1\_cat\_1 (k2\_oppcat\_1 X0)) \wedge & \\ ((v2\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ((v3\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ( & \\ (v4\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ((v5\_cat\_1 (k2\_oppcat\_1 X0)) \wedge (v6\_cat\_1 & \\ (k2\_oppcat\_1 X0)))))))))) & \end{aligned} \quad (3)$$

Assume the following.

$$\forall X0. ((\neg v11\_struct\_0 X0) \wedge (l5\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 (u4\_struct\_0 X0)) \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0. (l1\_graph\_1 X0) \Rightarrow ((v1\_funct\_1 (u2\_graph\_1 X0)) \wedge (( & \\ v1\_funct\_2 (u2\_graph\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0)) \wedge & \\ (m1\_subset\_1 (u2\_graph\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 & \\ X0) (u1\_struct\_0 X0)))))) & \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} \forall X0. (l1\_graph\_1 X0) \Rightarrow ((v1\_funct\_1 (u1\_graph\_1 X0)) \wedge (( & \\ v1\_funct\_2 (u1\_graph\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0)) \wedge & \\ (m1\_subset\_1 (u1\_graph\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 & \\ X0) (u1\_struct\_0 X0)))))) & \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0. (l1\_cat\_1 X0) \Rightarrow ((v1\_funct\_1 (u1\_cat\_1 X0)) \wedge (m1\_subset\_1 & \\ (u1\_cat\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 & \\ X0) (u4\_struct\_0 X0)) (u4\_struct\_0 X0)))))) & \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0. (l1\_graph\_1 X0) \Rightarrow (l5\_struct\_0 X0) \quad (8)$$

Assume the following.

$$\forall X0. (l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \quad (9)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. \forall X2. ((v1\_relat\_1 X1) \wedge ((v5\_relat\_1 & \\ X1 X0) \wedge (v1\_funct\_1 X1))) \Rightarrow (m1\_subset\_1 (k7\_partfun1 X0 X1 X2) X0) & \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 \\ & X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 \\ & X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge((v1\_funct\_1 X2)\wedge \\ & (v1\_funct\_2 X2 X1 (u4\_struct\_0 X0))\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0))))))\Rightarrow((v1\_funct\_1 (k4\_cat\_3 \\ & X0 X1 X2))\wedge((v1\_funct\_2 (k4\_cat\_3 X0 X1 X2) X1 (u4\_struct\_0 (k2\_oppcat\_1 \\ & X0)))\wedge(m1\_subset\_1 (k4\_cat\_3 X0 X1 X2) (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X1 (u4\_struct\_0 (k2\_oppcat\_1 X0))))))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\ & X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\ & X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow((\neg v2\_struct\_0 (k2\_oppcat\_1 X0))\wedge \quad (12) \\ & ((\neg v11\_struct\_0 (k2\_oppcat\_1 X0))\wedge((v1\_cat\_1 (k2\_oppcat\_1 X0))\wedge \\ & (l1\_cat\_1 (k2\_oppcat\_1 X0)))))) \end{aligned}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X0)\wedge \\ & ((\neg v1\_xboole\_0 X1)\wedge((\neg v1\_xboole\_0 X2)\wedge((v1\_funct\_1 X3)\wedge(m1\_subset\_1 \\ & X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1) X2))))))\Rightarrow(( \\ & v1\_funct\_1 (k1\_oppcat\_1 X0 X1 X2 X3))\wedge(m1\_subset\_1 (k1\_oppcat\_1 \\ & X0 X1 X2 X3) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0) X2)))) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\ & X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\ & X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 \\ & X0))\Rightarrow(k5\_oppcat\_1 X0 X1 = X1)) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\ & X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\ & X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.\forall X2.((v1\_funct\_1 \\ & X2)\wedge((v1\_funct\_2 X2 X1 (u4\_struct\_0 X0))\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0))))))\Rightarrow(\forall X3.((v1\_funct\_1 \\ & X3)\wedge((v1\_funct\_2 X3 X1 (u4\_struct\_0 (k2\_oppcat\_1 X0)))\wedge(m1\_subset\_1 \\ & X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 (u4\_struct\_0 (k2\_oppcat\_1 X0))))))\Rightarrow \\ & ((X3 = k4\_cat\_3 X0 X1 X2)\Leftrightarrow(\forall X4.(X4 \in X1)\Rightarrow(k7\_partfun1 (u4\_struct\_0 \\ & (k2\_oppcat\_1 X0)) X3 X4 = k5\_oppcat\_1 X0 (k7\_partfun1 (u4\_struct\_0 \\ & X0) X2 X4)))))) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (k2\_oppcat\_1 X0 = g1\_cat\_1 (u1\_struct\_0 \\ X0) (u4\_struct\_0 X0) (u2\_graph\_1 X0) (u1\_graph\_1 X0) (k1\_oppcat\_1 \\ (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_cat\_1 X0))) \end{aligned} \quad (16)$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1))) \Rightarrow ((v4\_relat\_1 X2 X0) \wedge (v5\_relat\_1 X2 X1)) \quad (17)$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1))) \Rightarrow (v1\_relat\_1 X2) \quad (18)$$

Assume the following.

$$\forall X0. (l1\_cat\_1 X0) \Rightarrow ((v1\_cat\_1 X0) \Rightarrow (X0 = g1\_cat\_1 (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 X0))) \quad (19)$$

**Theorem 1**

$$\begin{aligned} \forall X0. \forall X1. ((\neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge \\ ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge \\ ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))) \Rightarrow (\forall X2. ((v1\_funct\_1 \\ X2) \wedge ((v1\_funct\_2 X2 X0 (u4\_struct\_0 X1)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ (k2\_zfmisc\_1 X0 (u4\_struct\_0 X1)))))) \Rightarrow (r1\_funct\_2 X0 (u4\_struct\_0 \\ (k2\_oppcat\_1 (k2\_oppcat\_1 X1)) X0 (u4\_struct\_0 X1) (k4\_cat\_3 \\ (k2\_oppcat\_1 X1) X0 (k4\_cat\_3 X1 X0 X2)) X2)) \end{aligned}$$