

## t20\_cat\_3

(TMQiNr1QZqMLDdX8AtMfdeCPqsZxhjC3zfB)

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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  $v1\_funct\_1 : \iota \Rightarrow o$  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  $r2\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k6\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_funcop\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k7\_partfun1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_funcop\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l5\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  be given. Let  $k1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (\neg v1\_xboole\_0 X2) \Rightarrow (\forall X3. \\ & (m1\_subset\_1 X3 X2) \Rightarrow ((X1 \in X0) \Rightarrow (k7\_partfun1 X2 (k8\_funcop\_1 X2 \\ & X0 X3) X1 = X3))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (\neg v1\_xboole\_0 X1) \Rightarrow (\forall X2. ((v1\_funct\_1 \\ & X2) \wedge ((v1\_funct\_2 X2 X0 X1) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X0 X1)))))) \Rightarrow (\forall X3. ((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 X3 X0 X1) \wedge \\ & (m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1)))))) \Rightarrow ((\forall X4. \\ & (X4 \in X0) \Rightarrow (k7\_partfun1 X1 X2 X4 = k7\_partfun1 X1 X3 X4)) \Rightarrow (r2\_funct\_2 \\ & X0 X1 X2 X3))) \end{aligned} \tag{2}$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. ((\neg v1\_xboole\_0 X0) \wedge (m1\_subset\_1 X2 X0)) \Rightarrow (k8\_funcop\_1 X0 X1 X2 = k2\_funcop\_1 X1 X2) \tag{3}$$

Assume the following.

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

Assume the following.

$$\forall X0.(l1\_graph\_1 X0) \Rightarrow (l5\_struct\_0 X0) \quad (5)$$

Assume the following.

$$\forall X0.(l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0) \wedge (m1\_subset\_1 \\ X2 X0)) \Rightarrow ((v1\_funct\_1 (k8\_funcop\_1 X0 X1 X2)) \wedge (v1\_funct\_2 (k8\_funcop\_1 \\ X0 X1 X2) X1 X0) \wedge (m1\_subset\_1 (k8\_funcop\_1 X0 X1 X2) (k1\_zfmisc\_1 \\ (k2\_zfmisc\_1 X1 X0)))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\ X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 \\ X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \wedge ((( \\ v1\_funct\_1 X2) \wedge ((v1\_funct\_2 X2 X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 \\ X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0)))))) \wedge (m1\_subset\_1 \\ X3 (u4\_struct\_0 X0))) \Rightarrow ((v1\_funct\_1 (k6\_cat\_3 X0 X1 X2 X3)) \wedge (( \\ v1\_funct\_2 (k6\_cat\_3 X0 X1 X2 X3) X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 \\ (k6\_cat\_3 X0 X1 X2 X3) (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 (u4\_struct\_0 \\ X0)))))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.\forall X2.((v1\_funct\_1 \\ X2) \wedge ((v1\_funct\_2 X2 X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0)))))) \Rightarrow (\forall X3.((v1\_funct\_1 \\ X3) \wedge ((v1\_funct\_2 X3 X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 \\ (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0)))))) \Rightarrow (\forall X4.((v1\_funct\_1 \\ X4) \wedge ((v1\_funct\_2 X4 X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 X4 (k1\_zfmisc\_1 \\ (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0)))))) \Rightarrow ((X4 = k8\_cat\_3 X0 X1 X2 X3) \Leftrightarrow \\ (\forall X5.(X5 \in X1) \Rightarrow (k7\_partfun1 (u4\_struct\_0 X0) X4 X5 = k1\_cat\_1 \\ X0 (k7\_partfun1 (u4\_struct\_0 X0) X3 X5) (k7\_partfun1 (u4\_struct\_0 \\ X0) X2 X5)))))) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1. \forall X2. ((v1\_funct\_1 \\
& X2) \wedge ((v1\_funct\_2 X2 X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 \\
& (k2\_zfmisc\_1 X1 (u4\_struct\_0 X0)))))) \Rightarrow (\forall X3. (m1\_subset\_1 \\
& X3 (u4\_struct\_0 X0)) \Rightarrow (\forall X4. ((v1\_funct\_1 X4) \wedge ((v1\_funct\_2 \\
& X4 X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 X4 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& X1 (u4\_struct\_0 X0)))))) \Rightarrow ((X4 = k6\_cat\_3 X0 X1 X2 X3) \Leftrightarrow (\forall X5. \\
& (X5 \in X1) \Rightarrow (k7\_partfun1 (u4\_struct\_0 X0) X4 X5 = k1\_cat\_1 X0 X3 (k7\_partfun1 \\
& (u4\_struct\_0 X0) X2 X5))))))
\end{aligned} \tag{10}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0. \forall X1. ((\neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge \\
& ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge \\
& ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. (m1\_subset\_1 \\
& X2 (u4\_struct\_0 X1)) \Rightarrow (\forall X3. ((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 \\
& X3 X0 (u4\_struct\_0 X1)) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& X0 (u4\_struct\_0 X1)))))) \Rightarrow (r2\_funct\_2 X0 (u4\_struct\_0 X1) (k6\_cat\_3 \\
& X1 X0 X3 X2) (k8\_cat\_3 X1 X0 X3 (k8\_funcop\_1 (u4\_struct\_0 X1) X0 X2))))))
\end{aligned}$$