

t25\_cat\_3 (TM-  
RFmx1sTg6wDvoGCfmETxFT1YSWV8P5MJF)

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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  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k4\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\ & (m1\_cat\_1 X3 X0 X1 X2) \Rightarrow ((k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow (k5\_cat\_1 \\ & X0 X1 X2 X2 X3 (k4\_cat\_1 X0 X2) = X3)))))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\ & (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 \\ & (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_cat\_1 X5 X0 X1 X2) \Rightarrow (\forall X6. \\ & (m1\_cat\_1 X6 X0 X2 X3) \Rightarrow (\forall X7.(m1\_cat\_1 X7 X0 X3 X4) \Rightarrow (\neg (k2\_cat\_1 \\ & X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k2\_cat\_1 X0 X2 X3 \neq k1\_xboole\_0) \wedge ((k2\_cat\_1 \\ & X0 X3 X4 \neq k1\_xboole\_0) \wedge (k5\_cat\_1 X0 X1 X2 X4 X5 (k5\_cat\_1 X0 X2 X3 X4 \\ & X6 X7) \neq k5\_cat\_1 X0 X1 X3 X4 (k5\_cat\_1 X0 X1 X2 X3 X5 X6) X7)))))))))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\
& (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\neg(k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge \\
& ((k2\_cat\_1 X0 X2 X3 \neq k1\_xboole\_0) \wedge (k2\_cat\_1 X0 X1 X3 = k1\_xboole\_0))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\
& (((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 \\
& X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 \\
& X0))))))) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 X0)) \wedge ((m1\_subset\_1 \\
& X2 (u1\_struct\_0 X0)) \wedge ((m1\_subset\_1 X3 (u1\_struct\_0 X0)) \wedge ((m1\_cat\_1 \\
& X4 X0 X1 X2) \wedge (m1\_cat\_1 X5 X0 X2 X3)))))) \Rightarrow (m1\_cat\_1 (k5\_cat\_1 X0 X1 \\
& X2 X3 X4 X5) X0 X1 X3)
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\
& (m1\_cat\_1 X3 X0 X1 X2) \Rightarrow ((v2\_cat\_3 X3 X0 X1 X2) \Leftrightarrow ((k2\_cat\_1 X0 X1 X2 \neq \\
& k1\_xboole\_0) \wedge ((k2\_cat\_1 X0 X2 X1 \neq k1\_xboole\_0) \wedge (\exists X4.( \\
& m1\_cat\_1 X4 X0 X2 X1) \wedge (k5\_cat\_1 X0 X1 X2 X1 X3 X4 = k4\_cat\_1 X0 X1))))))
\end{aligned} \tag{5}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\
& (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_cat\_1 X4 X0 \\
& X1 X2) \Rightarrow (\forall X5.(m1\_cat\_1 X5 X0 X2 X3) \Rightarrow (((v2\_cat\_3 X4 X0 X1 X2) \wedge \\
& (v2\_cat\_3 X5 X0 X2 X3)) \Rightarrow (v2\_cat\_3 (k5\_cat\_1 X0 X1 X2 X3 X4 X5) X0 X1 \\
& X3))))))
\end{aligned}$$