

t3\_yellow20 (TMUH-  
NgiL39srxo9FB23H53WPdKnVGCc4X9w)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v12\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $l2\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v8\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v11\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v21\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k15\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k1\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k3\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_altcat\_2 : \iota \Rightarrow o$  be given. Let  $k6\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k13\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l1\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v10\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k11\_functor0 : \iota \Rightarrow \iota$  be given. Let  $k12\_functor0 : \iota \Rightarrow \iota$  be given. Let  $g2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v9\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge (l2\_altcat\_1 X0)) \Rightarrow (\forall X1. \\
& ((\neg v2\_struct\_0 X1) \wedge ((v1\_altcat\_2 X1) \wedge (l2\_altcat\_1 X1))) \Rightarrow (\forall X2. \\
& ((\neg v2\_struct\_0 X2) \wedge ((v1\_altcat\_2 X2) \wedge (l2\_altcat\_1 X2)))) \Rightarrow (\forall X3. \\
& ((v8\_functor0 X3 X0 X1) \wedge ((v11\_functor0 X3 X0 X1) \wedge (l2\_functor0 \\
& X3 X0 X1))) \Rightarrow (\forall X4. ((v8\_functor0 X4 X1 X2) \wedge ((v11\_functor0 \\
& X4 X1 X2) \wedge (l2\_functor0 X4 X1 X2)))) \Rightarrow (\forall X5. (m1\_subset\_1 X5 \\
& (u1\_struct\_0 X0)) \Rightarrow (\forall X6. (m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X7. (m1\_subset\_1 X7 (k1\_altcat\_1 X0 X5 X6)) \Rightarrow ((k1\_altcat\_1 \\
& X0 X5 X6 \neq k1\_xboole\_0) \Rightarrow (k6\_functor0 X0 X2 (k13\_functor0 X0 X1 X2 \\
& X3 X4) X5 X6 X7 = k8\_functor0 X1 X2 X4 (k3\_functor0 X0 X1 X3 X6) (k3\_functor0 \\
& X0 X1 X3 X5) (k8\_functor0 X0 X1 X3 X5 X6 X7))))))))) \\
& \tag{1}
\end{aligned}$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_altcat\_1 X0)) \Rightarrow (\forall X1. \\ & (m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 \\ & (u1\_struct\_0 X0)) \Rightarrow ((k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow (\forall X3. \\ & ((v8\_functor0 X3 X0 X0) \wedge ((v10\_functor0 X3 X0 X0) \wedge (l2\_functor0 \\ & X3 X0 X0))) \Rightarrow ((X3 = k11\_functor0 X0) \Rightarrow (\forall X4.(m1\_subset\_1 X4 \\ & (k1\_altcat\_1 X0 X1 X2)) \Rightarrow (k6\_functor0 X0 X0 X3 X1 X2 X4 = X4)))))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\ & X0) \wedge ((v1\_altcat\_2 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.((\neg \\ & v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge ((v1\_altcat\_2 \\ & X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2.((v8\_functor0 X2 X0 X1) \wedge \\ & (l2\_functor0 X2 X0 X1)) \Rightarrow ((v21\_functor0 X2 X0 X1) \Rightarrow (k13\_functor0 \\ & X0 X1 X0 X2 (k15\_functor0 X0 X1 X2) = k12\_functor0 X0))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\ & X0) \wedge ((v1\_altcat\_2 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.((\neg \\ & v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge ((v1\_altcat\_2 \\ & X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2.((v8\_functor0 X2 X0 X1) \wedge \\ & (l2\_functor0 X2 X0 X1)) \Rightarrow ((v21\_functor0 X2 X0 X1) \Rightarrow (\forall X3.( \\ & (v8\_functor0 X3 X1 X0) \wedge (l2\_functor0 X3 X1 X0)) \Rightarrow ((g2\_functor0 X1 \\ & X0 (u1\_functor0 X1 X0 X3) (u2\_functor0 X1 X0 X3) = k15\_functor0 X0 \\ & X1 X2) \Rightarrow (k13\_functor0 X1 X0 X1 X3 X2 = k12\_functor0 X1)))))) \end{aligned} \quad (4)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (k12\_functor0 X0 = k11\_functor0 X0) \quad (5)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_altcat\_1 X0)) \Rightarrow ((v8\_functor0 (k11\_functor0 X0) X0 X0) \wedge ((v9\_functor0 (k11\_functor0 X0) X0 X0) \wedge (v10\_functor0 (k11\_functor0 X0) X0 X0))) \quad (6)$$

Assume the following.

$$\forall X0. \forall X1. ((l1\_altcat\_1 X0) \wedge (l1\_altcat\_1 X1)) \Rightarrow (\forall X2. (l2\_functor0 X2 X0 X1) \Rightarrow (l1\_functor0 X2 X0 X1)) \quad (7)$$

Assume the following.

$$\forall X0. (l2\_altcat\_1 X0) \Rightarrow (l1\_altcat\_1 X0) \quad (8)$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2\_struct\_0 X0)\wedge(l1\_altcat\_1 X0))\wedge((\neg v2\_struct\_0 X1)\wedge \\
& (l1\_altcat\_1 X1))\wedge((v11\_functor0 X2 X0 X1)\wedge(l2\_functor0 X2 X0 \\
& X1))\wedge((m1\_subset\_1 X3 (u1\_struct\_0 X0))\wedge((m1\_subset\_1 X4 (u1\_struct\_0 \\
& X0))\wedge(m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4))))))\Rightarrow(m1\_subset\_1 \\
& (k8\_functor0 X0 X1 X2 X3 X4 X5) (k1\_altcat\_1 X1 (k3\_functor0 X0 X1 \\
& X2 X4) (k3\_functor0 X0 X1 X2 X3)))
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\
& X0)\wedge(l1\_altcat\_1 X0))\wedge((\neg v2\_struct\_0 X1)\wedge(l1\_altcat\_1 X1))\wedge \\
& ((l1\_functor0 X2 X0 X1)\wedge(m1\_subset\_1 X3 (u1\_struct\_0 X0))))\Rightarrow \\
& (m1\_subset\_1 (k3\_functor0 X0 X1 X2 X3) (u1\_struct\_0 X1))
\end{aligned} \tag{10}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge(l1\_altcat\_1 \\
& X0))\wedge((\neg v2\_struct\_0 X1)\wedge(l1\_altcat\_1 X1))\wedge(l2\_functor0 X2 \\
& X0 X1))\Rightarrow((v9\_functor0 (k15\_functor0 X0 X1 X2) X1 X0)\wedge(l2\_functor0 \\
& (k15\_functor0 X0 X1 X2) X1 X0))
\end{aligned} \tag{11}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(l1\_altcat\_1 X0)\Rightarrow((v9\_functor0 (k11\_functor0 X0 \\
& X0 X0)\wedge(l2\_functor0 (k11\_functor0 X0) X0 X0))
\end{aligned} \tag{12}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0)\wedge(l1\_altcat\_1 X0))\Rightarrow(\forall X1. \\
& ((\neg v2\_struct\_0 X1)\wedge(l1\_altcat\_1 X1))\Rightarrow(\forall X2.((v11\_functor0 \\
& X2 X0 X1)\wedge(l2\_functor0 X2 X0 X1))\Rightarrow((v8\_functor0 X2 X0 X1)\Leftrightarrow(\forall X3. \\
& (m1\_subset\_1 X3 (u1\_struct\_0 X0))\Rightarrow(\forall X4.(m1\_subset\_1 X4 \\
& (u1\_struct\_0 X0))\Rightarrow(\neg(k1\_altcat\_1 X0 X3 X4\neq k1\_xboole\_0)\wedge(k1\_altcat\_1 \\
& X1 (k3\_functor0 X0 X1 X2 X4) (k3\_functor0 X0 X1 X2 X3) = k1\_xboole\_0))))))
\end{aligned} \tag{13}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(l2\_altcat\_1 X0)\Rightarrow(((\neg v2\_struct\_0 X0)\wedge(v12\_altcat\_1 \\
& X0))\Rightarrow((\neg v2\_struct\_0 X0)\wedge(v1\_altcat\_2 X0)))
\end{aligned} \tag{14}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.((l1\_altcat\_1 X0)\wedge((l1\_altcat\_1 \\
& X1)\wedge(l2\_functor0 X2 X0 X1))\Rightarrow((v9\_functor0 X2 X0 X1)\Rightarrow(X2 = g2\_functor0 \\
& X0 X1 (u1\_functor0 X0 X1 X2) (u2\_functor0 X0 X1 X2)))
\end{aligned} \tag{15}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\ & X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\ & X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v8\_functor0 \\ & X2 X0 X1) \wedge ((v11\_functor0 X2 X0 X1) \wedge (l2\_functor0 X2 X0 X1))) \Rightarrow (\forall X3. \\ & ((v8\_functor0 X3 X1 X0) \wedge ((v11\_functor0 X3 X1 X0) \wedge (l2\_functor0 \\ & X3 X1 X0))) \Rightarrow (((v21\_functor0 X2 X0 X1) \wedge (X3 = k15\_functor0 X0 X1 X2)) \Rightarrow \\ & (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_subset\_1 \\ & X5 (u1\_struct\_0 X0)) \Rightarrow ((k1\_altcat\_1 X0 X4 X5 \neq k1\_xboole\_0) \Rightarrow (\forall X6. \\ & (m1\_subset\_1 X6 (k1\_altcat\_1 X0 X4 X5)) \Rightarrow (\forall X7.(m1\_subset\_1 \\ & X7 (k1\_altcat\_1 X1 (k3\_functor0 X0 X1 X2 X5) (k3\_functor0 X0 X1 X2 \\ & X4))) \Rightarrow ((k8\_functor0 X0 X1 X2 X4 X5 X6 = X7) \Leftrightarrow (k8\_functor0 X1 X0 X3 ( \\ & k3\_functor0 X0 X1 X2 X5) (k3\_functor0 X0 X1 X2 X4) X7 = X6)))))))))) \end{aligned}$$