

## t32\_index\_1

(TMVgweLrV4fj4G8D4qw9zE6UieKmX4Ew4Us)

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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  $v3\_cat\_5 : \iota \Rightarrow o$  be given. Let  $m5\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u1\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u2\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $k7\_isocat\_1 : \iota \Rightarrow \iota$  be given. Let  $m4\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k16\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k14\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m3\_cat\_2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_cat\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k7\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l1\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $l5\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  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  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m3\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $k10\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the

following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& ((\neg v2\_struct\_0 X2) \wedge ((\neg v11\_struct\_0 X2) \wedge ((v2\_cat\_1 X2) \wedge ((v3\_cat\_1 \\
& X2) \wedge ((v4\_cat\_1 X2) \wedge ((v5\_cat\_1 X2) \wedge ((v6\_cat\_1 X2) \wedge (l1\_cat\_1 \\
& X2))))))) \Rightarrow (\forall X3.((\neg v2\_struct\_0 X3) \wedge ((\neg v11\_struct\_0 \\
& X3) \wedge ((v2\_cat\_1 X3) \wedge ((v3\_cat\_1 X3) \wedge ((v4\_cat\_1 X3) \wedge ((v5\_cat\_1 \\
& X3) \wedge ((v6\_cat\_1 X3) \wedge (l1\_cat\_1 X3))))))) \Rightarrow (\forall X4.(m5\_index\_1 \\
& X4 (u1\_struct\_0 X3) (u4\_struct\_0 X3) (u1\_graph\_1 X3) (u2\_graph\_1 \\
& X3) (u1\_cat\_1 X3) (k7\_isocat\_1 X3)) \Rightarrow (\forall X5.(m2\_cat\_1 X5 X0 \\
& X1) \Rightarrow (\forall X6.(m2\_cat\_1 X6 X0 X2) \Rightarrow (((m3\_cat\_2 (k4\_cat\_5 X0 X1 \\
& X5) X3) \wedge ((m3\_cat\_2 (k4\_cat\_5 X0 X2 X6) X3) \wedge (r1\_funct\_2 (u4\_struct\_0 \\
& X0) (u4\_struct\_0 X1) (u4\_struct\_0 X0) (u4\_struct\_0 X2) X5 X6))) \Rightarrow \\
& (k14\_index\_1 X0 X1 X3 X5 X4 = k14\_index\_1 X0 X2 X3 X6 X4))))))))) \tag{1}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m5\_index\_1 X1 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\
& X0) (k7\_isocat\_1 X0)) \Rightarrow (\forall X2.(m4\_index\_1 X2 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) X1) \Rightarrow (\forall X3. \\
& (m4\_index\_1 X3 (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) \\
& (u2\_graph\_1 X0) X1) \Rightarrow ((r1\_funct\_2 (u4\_struct\_0 X0) (u4\_struct\_0 \\
& X2) (u4\_struct\_0 X0) (u4\_struct\_0 X3) (k9\_index\_1 X0 X1 X2) (k9\_index\_1 \\
& X0 X1 X3)) \wedge (r1\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 X2) (u1\_struct\_0 \\
& X0) (u1\_struct\_0 X3) (k7\_cat\_1 X0 X2 (k9\_index\_1 X0 X1 X2)) (k7\_cat\_1 \\
& X0 X3 (k9\_index\_1 X0 X1 X3))))))))) \tag{2}
\end{aligned}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 (u1\_struct\_0 X0)) \tag{3}$$

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.

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

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.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & ((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge (((v1\_funct\_1 X2) \wedge (( \\ & v1\_funct\_2 X2 X1 X0) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X1 X0)))))) \wedge (((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 X3 X1 X0) \wedge (m1\_subset\_1 \\ & X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0)))))) \wedge (((v1\_funct\_1 X4) \wedge (m1\_subset\_1 \\ & X4 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X1 X1) X1)))))) \wedge ((v1\_funct\_1 \\ & X5) \wedge ((v1\_funct\_2 X5 X0 X1) \wedge (m1\_subset\_1 X5 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X0 X1))))))))) \Rightarrow (\forall X6.(m5\_index\_1 X6 X0 X1 X2 X3 X4 X5) \Rightarrow (m3\_index\_1 \\ & X6 X0 X1 X2 X3)) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1\_xboole\_0 \\ & X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge (((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 X2 X1 \\ & X0) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0)))))) \wedge ((( \\ & v1\_funct\_1 X3) \wedge ((v1\_funct\_2 X3 X1 X0) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X1 X0)))))) \wedge (m3\_index\_1 X4 X0 X1 X2 X3)))) \Rightarrow (\forall X5. \\ & (m4\_index\_1 X5 X0 X1 X2 X3 X4) \Rightarrow ((\neg v2\_struct\_0 X5) \wedge ((\neg v11\_struct\_0 \\ & X5) \wedge ((v2\_cat\_1 X5) \wedge ((v3\_cat\_1 X5) \wedge ((v4\_cat\_1 X5) \wedge ((v5\_cat\_1 \\ & X5) \wedge ((v6\_cat\_1 X5) \wedge ((v3\_cat\_5 X5) \wedge (l1\_cat\_1 X5)))))))))) \end{aligned} \quad (9)$$

Assume the following.

$$\forall X0.(l5\_struct\_0 X0) \Rightarrow (l1\_struct\_0 X0) \quad (10)$$

Assume the following.

$$\forall X0.(l1\_graph\_1 X0) \Rightarrow (l5\_struct\_0 X0) \quad (11)$$

Assume the following.

$$\forall X0.(l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \quad (12)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 \\ X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 \\ X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))))) \wedge ((m5\_index\_1 X1 (u1\_struct\_0 \\ X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\ X0) (k7\_isocat\_1 X0)) \wedge (m4\_index\_1 X2 (u1\_struct\_0 X0) (u4\_struct\_0 \\ X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) X1))) \Rightarrow (m2\_cat\_1 (k9\_index\_1 \\ X0 X1 X2) X0 X2) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))))) \Rightarrow ((v1\_funct\_1 (k7\_isocat\_1 X0)) \wedge (( \\ v1\_funct\_2 (k7\_isocat\_1 X0) (u1\_struct\_0 X0) (u4\_struct\_0 X0)) \wedge \\ (m1\_subset\_1 (k7\_isocat\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u1\_struct\_0 \\ X0) (u4\_struct\_0 X0)))))) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 \\ X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 \\ X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))))) \wedge (((\neg v2\_struct\_0 X1) \wedge \\ ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\ X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))))) \wedge (m2\_cat\_1 \\ X2 X0 X1)) \Rightarrow ((v1\_cat\_1 (k4\_cat\_5 X0 X1 X2)) \wedge (m3\_cat\_2 (k4\_cat\_5 \\ X0 X1 X2) X1)) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge \\ ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge \\ ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))))) \wedge (m5\_index\_1 X1 (u1\_struct\_0 \\ X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\ X0) (k7\_isocat\_1 X0)) \Rightarrow ((v1\_cat\_1 (k10\_index\_1 X0 X1)) \wedge (m4\_index\_1 \\ (k10\_index\_1 X0 X1) (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 \\ X0) (u2\_graph\_1 X0) X1)) \end{aligned} \quad (16)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m5\_index\_1 X2 (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) \\
& (u2\_graph\_1 X0) (u1\_cat\_1 X0) (k7\_isocat\_1 X0)) \Rightarrow (\forall X3.( \\
& m5\_index\_1 X3 (u1\_struct\_0 X1) (u4\_struct\_0 X1) (u1\_graph\_1 X1) \\
& (u2\_graph\_1 X1) (u1\_cat\_1 X1) (k7\_isocat\_1 X1)) \Rightarrow (k16\_index\_1 \\
& X0 X1 X2 X3 = k14\_index\_1 X0 (k10\_index\_1 X0 X2) X1 (k9\_index\_1 X0 X2 \\
& (k10\_index\_1 X0 X2) X3))))
\end{aligned} \tag{17}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m5\_index\_1 X1 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\
& X0) (k7\_isocat\_1 X0)) \Rightarrow (\forall X2.((v1\_cat\_1 X2) \wedge (m4\_index\_1 \\
& X2 (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 \\
& X0) X1)) \Rightarrow ((X2 = k10\_index\_1 X0 X1) \Leftrightarrow (\forall X3.(m4\_index\_1 X3 ( \\
& u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) \\
& X1) \Rightarrow (X2 = k4\_cat\_5 X0 X3 (k9\_index\_1 X0 X1 X3))))))
\end{aligned} \tag{18}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge ((v3\_cat\_5 X1) \wedge (l1\_cat\_1 \\
& X1)))))))) \Rightarrow (\forall X2.(m5\_index\_1 X2 (u1\_struct\_0 X0) (u4\_struct\_0 \\
& X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 X0) (k7\_isocat\_1 \\
& X0)) \Rightarrow (\forall X3.(m5\_index\_1 X3 (u1\_struct\_0 X1) (u4\_struct\_0 \\
& X1) (u1\_graph\_1 X1) (u2\_graph\_1 X1) (u1\_cat\_1 X1) (k7\_isocat\_1 \\
& X1)) \Rightarrow (\forall X4.(m4\_index\_1 X4 (u1\_struct\_0 X0) (u4\_struct\_0 \\
& X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) X2) \Rightarrow ((m4\_index\_1 X1 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) X2) \Rightarrow (k16\_index\_1 \\
& X0 X1 X2 X3 = k14\_index\_1 X0 X4 X1 (k9\_index\_1 X0 X2 X4) X3))))))
\end{aligned}$$