

# t37\_sublemma (TMdepHc- ShcXVpMm6iWySTAh2uvbGx56ZH8P)

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Let  $m1\_qc\_lang1 : \iota \Rightarrow o$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k3\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k16\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k38\_subst1 : \iota \Rightarrow \iota$  be given. Let  $m1\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k7\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v3\_subst1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k30\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k23\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $v1\_sublemma : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k24\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v7\_subst1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} \forall X0. \forall X1. ((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge \\ (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2. (m2\_subset\_1 \\ X2 X0 X1) \Leftrightarrow (m1\_subset\_1 X2 X1)) \end{aligned} \quad (1)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. \forall X2. ((m1\_qc\_lang1 X0) \wedge ((m1\_subset\_1 \\ X1 (k38\_subst1 X0)) \wedge (m1\_subset\_1 X2 (k3\_qc\_lang1 X0)))) \Rightarrow (k7\_sublemma \\ X0 X1 X2 = k4\_tarski X1 X2) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. ((m1\_qc\_lang1 X0) \wedge (m1\_subset\_1 X1 (k2\_zfmisc\_1 \\ (k16\_subst1 X0) (k3\_qc\_lang1 X0)))) \Rightarrow (k23\_subst1 X0 X1 = k2\_xtuple\_0 \\ X1) \end{aligned} \quad (3)$$

Assume the following.

$$\forall X0. \forall X1. k2\_xtuple\_0 (k4\_tarski X0 X1) = X1 \quad (4)$$

Assume the following.

$$\forall X0. (m1\_qc\_lang1 X0) \Rightarrow (\neg v1\_xboole\_0 (k38\_subst1 X0)) \quad (5)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\neg v1\_xboole\_0\ (k3\_qc\_lang1\ X0)) \quad (6)$$

Assume the following.

$$\begin{aligned} &\forall X0.\forall X1.\forall X2.((m1\_qc\_lang1\ X0)\wedge((m1\_subset\_1 \\ &X1\ (k38\_subst1\ X0))\wedge(m1\_subset\_1\ X2\ (k3\_qc\_lang1\ X0))))\Rightarrow(( \\ &v1\_sublemma\ (k7\_sublemma\ X0\ X1\ X2)\ X0)\wedge(m1\_subset\_1\ (k7\_sublemma \\ &X0\ X1\ X2)\ (k2\_zfmisc\_1\ (k16\_subst1\ X0)\ (k3\_qc\_lang1\ X0)))) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(m1\_subset\_1\ (k3\_qc\_lang1\ X0)\ (k1\_zfmisc\_1\ (k2\_qc\_lang1\ X0))) \quad (8)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(m1\_subset\_1\ (k38\_subst1\ X0)\ (k1\_zfmisc\_1\ (k16\_subst1\ X0))) \quad (9)$$

Assume the following.

$$\begin{aligned} &\forall X0.\forall X1.\forall X2.((m1\_qc\_lang1\ X0)\wedge((m1\_subset\_1 \\ &X1\ (k2\_zfmisc\_1\ (k16\_subst1\ X0)\ (k3\_qc\_lang1\ X0))\wedge(m1\_subset1 \\ &X2\ X0\ X1))))\Rightarrow(m1\_subset\_1\ (k24\_subst1\ X0\ X1\ X2)\ (k16\_subst1 \\ &X0)) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} &\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\forall X1.((v1\_sublemma\ X1\ X0)\wedge \\ &(m1\_subset\_1\ X1\ (k2\_zfmisc\_1\ (k16\_subst1\ X0)\ (k3\_qc\_lang1\ X0))))\Rightarrow \\ &(\forall X2.(m1\_subset1\ X2\ X0\ X1)\Rightarrow((v3\_subst1\ X1\ X0)\Rightarrow(k9\_sublemma \\ &X0\ X1\ X2 = k24\_subst1\ X0\ X1\ X2)))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} &\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (k16\_subst1 \\ &X0))\Rightarrow((v7\_subst1\ X1\ X0)\Rightarrow(\forall X2.(m2\_subset\_1\ X2\ (k2\_qc\_lang1 \\ &X0)\ (k3\_qc\_lang1\ X0))\Rightarrow((X2 = k30\_subst1\ X0\ X1)\Leftrightarrow(\exists X3.( \\ &m1\_subset\_1\ X3\ (k2\_zfmisc\_1\ (k16\_subst1\ X0)\ (k3\_qc\_lang1\ X0))\wedge \\ &(\exists X4.(m1\_subset1\ X4\ X0\ X3)\wedge((X1 = k24\_subst1\ X0\ X3\ X4)\wedge \\ &((k23\_subst1\ X0\ X3 = X2)\wedge(v3\_subst1\ X3\ X0)))))))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} &\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (k16\_subst1 \\ &X0))\Rightarrow((v7\_subst1\ X1\ X0)\Leftrightarrow(\exists X2.(m1\_subset\_1\ X2\ (k2\_zfmisc\_1 \\ &(k16\_subst1\ X0)\ (k3\_qc\_lang1\ X0))\wedge(\exists X3.(m1\_subset1 \\ &X3\ X0\ X2)\wedge((X1 = k24\_subst1\ X0\ X2\ X3)\wedge(v3\_subst1\ X2\ X0)))))) \end{aligned} \quad (13)$$

Assume the following.

$$\forall X0.(v1\_xboole\_0 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)) \Rightarrow (v1\_xboole\_0 X1)) \quad (14)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k2\_qc\_lang1 \\ & X0) (k3\_qc\_lang1 X0)) \Rightarrow (\forall X2.(m2\_subset\_1 X2 (k16\_subst1 \\ & X0) (k38\_subst1 X0)) \Rightarrow (\forall X3.(m1\_subst1 X3 X0 (k7\_sublemma \\ & X0 X2 X1)) \Rightarrow ((v3\_subst1 (k7\_sublemma X0 X2 X1) X0) \Rightarrow (k30\_subst1 \\ & X0 (k9\_sublemma X0 (k7\_sublemma X0 X2 X1) X3) = X1)))))) \end{aligned}$$