

# t22\_sublemma (TM- SUp2FWm9fsNS8Z9KMdD6Y1GuVm6BJYENp)

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Let  $m1\_qc\_lang1 : \iota \Rightarrow o$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $m2\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k2\_valuat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k16\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k38\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k19\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r2\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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  $m1\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $k4\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k16\_subst1 \\ & X0) (k38\_subst1 X0)) \Rightarrow (\forall X2.(m2\_subset\_1 X2 (k16\_subst1 \\ & X0) (k38\_subst1 X0)) \Rightarrow ((k19\_subst1 X0 X1 = k19\_subst1 X0 X2) \Rightarrow \\ & (k19\_subst1 X0 (k6\_sublemma X0 X1 X2) = k19\_subst1 X0 X1))) \end{aligned} \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((m1\_subset\_1 X2 \\ & (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1))) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X0 X1)))) \Rightarrow ((r2\_relset\_1 X0 X1 X2 X3) \Leftrightarrow (X2 = X3)) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge \\ & (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2.(m2\_subset\_1 \\ & X2 X0 X1) \Leftrightarrow (m1\_subset\_1 X2 X1)) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X1) \wedge (m1\_funct\_2 \\ & X2 X0 X1)) \Rightarrow (\forall X3.(m2\_funct\_2 X3 X0 X1 X2) \Leftrightarrow (m1\_subset\_1 X3 \\ & X2)) \end{aligned} \quad (4)$$

Assume the following.

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

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.((m1\_qc\_lang1 X0) \wedge ((m1\_subset\_1 \\ X1 (k38\_subst1 X0)) \wedge (m1\_subset\_1 X2 (k38\_subst1 X0)))) \Rightarrow ( \\ m2\_subset\_1 (k6\_sublemma X0 X1 X2) (k16\_subst1 X0) (k38\_subst1 \\ X0)) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3.((m1\_qc\_lang1 X0) \wedge \\ ((m1\_subset\_1 X1 (k38\_subst1 X0)) \wedge (\neg v1\_xboole\_0 X2) \wedge (m1\_subset\_1 \\ X3 (k2\_valuat\_1 X0 X2)))) \Rightarrow ((v1\_funct\_1 (k3\_sublemma X0 X1 X2 X3)) \wedge \\ (m1\_subset\_1 (k3\_sublemma X0 X1 X2 X3) (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ (k3\_qc\_lang1 X0) X2)))) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (m1\_subset\_1 (k38\_subst1 X0) ( \\ k1\_zfmisc\_1 (k16\_subst1 X0))) \quad (8)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.((m1\_qc\_lang1 X0) \wedge (\neg v1\_xboole\_0 X1)) \Rightarrow \\ (m1\_funct\_2 (k2\_valuat\_1 X0 X1) (k3\_qc\_lang1 X0) X1) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k16\_subst1 \\ X0) (k38\_subst1 X0)) \Rightarrow (\forall X2.(\neg v1\_xboole\_0 X2) \Rightarrow (\forall X3. \\ (m2\_funct\_2 X3 (k3\_qc\_lang1 X0) X2 (k2\_valuat\_1 X0 X2)) \Rightarrow (k3\_sublemma \\ X0 X1 X2 X3 = k4\_relset\_1 (k3\_qc\_lang1 X0) (k3\_qc\_lang1 X0) (k3\_qc\_lang1 \\ X0) X2 (k2\_subst1 X0 (k19\_subst1 X0 X1)) X3)))) \end{aligned} \quad (10)$$

Assume the following.

$$\forall X0.(v1\_xboole\_0 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k1\_zfmisc\_1 \\ X0)) \Rightarrow (v1\_xboole\_0 X1)) \quad (11)$$

### Theorem 1

$$\begin{aligned} \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(\neg v1\_xboole\_0 X1) \Rightarrow ( \\ \forall X2.(m2\_funct\_2 X2 (k3\_qc\_lang1 X0) X1 (k2\_valuat\_1 X0 X1)) \Rightarrow \\ (\forall X3.(m2\_subset\_1 X3 (k16\_subst1 X0) (k38\_subst1 X0)) \Rightarrow \\ (\forall X4.(m2\_subset\_1 X4 (k16\_subst1 X0) (k38\_subst1 X0)) \Rightarrow \\ ((k19\_subst1 X0 X3 = k19\_subst1 X0 X4) \Rightarrow ((r2\_relset\_1 (k3\_qc\_lang1 \\ X0) X1 (k3\_sublemma X0 X3 X1 X2) (k3\_sublemma X0 (k6\_sublemma X0 X3 \\ X4) X1 X2)) \wedge (r2\_relset\_1 (k3\_qc\_lang1 X0) X1 (k3\_sublemma X0 X4 \\ X1 X2) (k3\_sublemma X0 (k6\_sublemma X0 X3 X4) X1 X2)))))))) \end{aligned}$$