

## t2\_substut2

(TMXTcywM53NPrjxK7SkpWFYNVYn5SBGC3e1)

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Let  $m1\_qc\_lang1 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_numbers : \iota$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k6\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k8\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v5\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $v3\_card\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_finseq\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k1\_substut1 : \iota \Rightarrow \iota$  be given. Let  $k16\_substut1 : \iota \Rightarrow \iota$  be given. Let  $k38\_substut1 : \iota \Rightarrow \iota$  be given. Let  $k2\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_cqc\_lang : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k19\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k17\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_domain\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k10\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k3\_cqc\_lang : \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_xxreal\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $np\_1 : \iota$  be given. Let  $k3\_finseq\_1 : \iota \Rightarrow \iota$  be given. Let  $k5\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k4\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $m1\_finseq\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_tarski : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k1\_substut1 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 k5\_numbers) \Rightarrow (\forall X3.(m2\_subset\_1 \\ & X3 (k6\_qc\_lang1 X0) (k8\_qc\_lang1 X0 X2)) \Rightarrow (\forall X4.((v3\_card\_1 \\ & X4 X2) \wedge (m2\_finseq\_1 X4 (k2\_qc\_lang1 X0))) \Rightarrow (k17\_substut1 X0 X3 \\ & X4 X1 = k1\_domain\_1 (k9\_qc\_lang1 X0) (k1\_substut1 X0) (k10\_qc\_lang1 \\ & X0 X3 X4) X1)))))) \end{aligned} \tag{1}$$

Assume the following.

$$\forall X0.\forall X1.(k1\_xtuple\_0 (k4\_tarski X0 X1) = X0) \wedge (k2\_xtuple\_0 (k4\_tarski X0 X1) = X1) \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(m1\_qc\_lang1\ X0) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ k5\_numbers) \Rightarrow \\
& (\forall X2.(m2\_subset\_1\ X2\ (k6\_qc\_lang1\ X0)\ (k8\_qc\_lang1\ X0\ X1)) \Rightarrow \\
& (\forall X3.((v3\_card\_1\ X3\ X1) \wedge (m2\_finseq\_1\ X3\ (k2\_qc\_lang1\ X0))) \Rightarrow \\
& ((m2\_subset\_1\ (k10\_qc\_lang1\ X0\ X2\ X3)\ (k9\_qc\_lang1\ X0)\ (k3\_qc\_lang1 \\
& \quad X0)) \Leftrightarrow ((ReplSep\ (toset\ (\lambda X4 : \iota.m1\_subset\_1\ X4\ k5\_numbers)) \\
& \quad (\lambda X4 : \iota.(r1\_xxreal\_0\ np\_1\ X4) \wedge ((r1\_xxreal\_0\ X4\ (k3\_finseq\_1 \\
& \quad X3)) \wedge (k1\_funct\_1\ X3\ X4 \in k5\_qc\_lang1\ X0))) (\lambda X4 : \iota.k1\_funct\_1 \\
& \quad X3\ X4) = k1\_xboole\_0) \wedge (ReplSep\ (toset\ (\lambda X4 : \iota.m1\_subset\_1 \\
& \quad X4\ k5\_numbers)) (\lambda X4 : \iota.(r1\_xxreal\_0\ np\_1\ X4) \wedge ((r1\_xxreal\_0 \\
& \quad X4\ (k3\_finseq\_1\ X3)) \wedge (k1\_funct\_1\ X3\ X4 \in k4\_qc\_lang1\ X0))) (\lambda X4 : \\
& \quad \iota.k1\_funct\_1\ X3\ X4) = k1\_xboole\_0))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(m1\_qc\_lang1\ X0) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ k5\_numbers) \Rightarrow \\
& (\forall X2.((v3\_card\_1\ X2\ X1) \wedge (m2\_finseq\_1\ X2\ (k2\_qc\_lang1\ X0))) \Rightarrow \\
& (((v5\_relat\_1\ X2\ (k3\_qc\_lang1\ X0)) \wedge ((v3\_card\_1\ X2\ X1) \wedge (m2\_finseq\_1 \\
& \quad X2\ (k2\_qc\_lang1\ X0)))) \Leftrightarrow ((ReplSep\ (toset\ (\lambda X3 : \iota.m1\_subset\_1 \\
& \quad X3\ k5\_numbers)) (\lambda X3 : \iota.(r1\_xxreal\_0\ np\_1\ X3) \wedge ((r1\_xxreal\_0 \\
& \quad X3\ (k3\_finseq\_1\ X2)) \wedge (k1\_funct\_1\ X2\ X3 \in k5\_qc\_lang1\ X0))) (\lambda X3 : \\
& \quad \iota.k1\_funct\_1\ X2\ X3) = k1\_xboole\_0) \wedge (ReplSep\ (toset\ (\lambda X3 : \\
& \quad \iota.m1\_subset\_1\ X3\ k5\_numbers)) (\lambda X3 : \iota.(r1\_xxreal\_0\ np\_1 \\
& \quad X3) \wedge ((r1\_xxreal\_0\ X3\ (k3\_finseq\_1\ X2)) \wedge (k1\_funct\_1\ X2\ X3 \in k4\_qc\_lang1 \\
& \quad X0))) (\lambda X3 : \iota.k1\_funct\_1\ X2\ X3) = k1\_xboole\_0))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.((\neg v1\_xboole\_0\ X0) \wedge ((\neg v1\_xboole\_0\ X1) \wedge \\
& (m1\_subset\_1\ X1\ (k1\_zfmisc\_1\ X0)))) \Rightarrow (\forall X2.(m2\_subset\_1 \\
& \quad X2\ X0\ X1) \Leftrightarrow (m1\_subset\_1\ X2\ X1))
\end{aligned} \tag{5}$$

Assume the following.

$$\forall X0.\forall X1.(m2\_finseq\_1\ X1\ X0) \Leftrightarrow (m1\_finseq\_1\ X1\ X0) \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((m1\_subset\_1 \\
& \quad X0\ k5\_numbers) \wedge ((m1\_qc\_lang1\ X1) \wedge ((m1\_subset\_1\ X2\ (k8\_qc\_lang1 \\
& \quad X1\ X0)) \wedge (((v5\_relat\_1\ X3\ (k3\_qc\_lang1\ X1)) \wedge (v3\_card\_1\ X3\ X0) \wedge \\
& \quad (m1\_finseq\_1\ X3\ (k2\_qc\_lang1\ X1)))) \wedge (m1\_subset\_1\ X4\ (k1\_subst1 \\
& \quad X1)))))) \Rightarrow (k4\_sublemma\ X0\ X1\ X2\ X3\ X4 = k17\_subst1\ X1\ X2\ X3\ X4)
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((m1\_subset\_1 X0 \\ & k5\_numbers)\wedge((m1\_qc\_lang1 X1)\wedge((m1\_subset\_1 X2 (k8\_qc\_lang1 \\ & X1 X0))\wedge((v5\_relat\_1 X3 (k3\_qc\_lang1 X1))\wedge((v3\_card\_1 X3 X0)\wedge \\ & (m1\_finseq\_1 X3 (k2\_qc\_lang1 X1))))))\Rightarrow(k4\_cqc\_lang X0 X1 X2 X3 = \\ & k10\_qc\_lang1 X1 X2 X3) \end{aligned} \tag{8}$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0)\wedge(m1\_subset\_1 X1 (k38\_subst1 X0)))\Rightarrow(k2\_sublemma X0 X1 = k1\_xtuple\_0 X1) \tag{9}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X0)\wedge \\ & ((\neg v1\_xboole\_0 X1)\wedge((m1\_subset\_1 X2 X0)\wedge(m1\_subset\_1 X3 X1))))\Rightarrow \\ & (k1\_domain\_1 X0 X1 X2 X3 = k4\_tarSKI X2 X3) \end{aligned} \tag{10}$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0)\wedge(m1\_subset\_1 X1 (k16\_subst1 X0)))\Rightarrow(k19\_subst1 X0 X1 = k2\_xtuple\_0 X1) \tag{11}$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k38\_subst1 X0)) \tag{12}$$

Assume the following.

$$\forall X0.\forall X1.((m1\_subset\_1 X0 k5\_numbers)\wedge(m1\_qc\_lang1 X1))\Rightarrow(\neg v1\_xboole\_0 (k8\_qc\_lang1 X1 X0)) \tag{13}$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k3\_cqc\_lang X0)) \tag{14}$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k1\_subst1 X0)) \tag{15}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((\neg v1\_xboole\_0 X0)\wedge((\neg v1\_xboole\_0 X1)\wedge \\ & (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0))))\Rightarrow(\forall X2.(m2\_subset\_1 \\ & X2 X0 X1)\Rightarrow(m1\_subset\_1 X2 X0)) \end{aligned} \tag{16}$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k9\_qc\_lang1 X0)) \tag{17}$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1\ X0)\wedge(m1\_subset\_1\ X1\ k5\_numbers))\Rightarrow (m1\_subset\_1\ (k8\_qc\_lang1\ X0\ X1)\ (k1\_zfmisc\_1\ (k6\_qc\_lang1\ X0))) \quad (18)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((m1\_subset\_1\ X0\ k5\_numbers)\wedge((m1\_qc\_lang1\ X1)\wedge((m1\_subset\_1\ X2\ (k8\_qc\_lang1\ X1\ X0))\wedge((v5\_relat\_1\ X3\ (k3\_qc\_lang1\ X1))\wedge((v3\_card\_1\ X3\ X0)\wedge(m1\_finseq\_1\ X3\ (k2\_qc\_lang1\ X1))))))\wedge(m1\_subset\_1\ X4\ (k1\_subst1\ X1))))\Rightarrow(m2\_subset\_1\ (k4\_sublemma\ X0\ X1\ X2\ X3\ X4)\ (k16\_subst1\ X1)\ (k38\_subst1\ X1)) \quad (19)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(m1\_subset\_1\ (k3\_cqc\_lang\ X0)\ (k1\_zfmisc\_1\ (k9\_qc\_lang1\ X0))) \quad (20)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(m1\_subset\_1\ (k38\_subst1\ X0)\ (k1\_zfmisc\_1\ (k16\_subst1\ X0))) \quad (21)$$

Assume the following.

$$\forall X0.\forall X1.k4\_tarski\ X0\ X1 = k2\_tarski\ (k2\_tarski\ X0\ X1)\ (k1\_tarski\ X0) \quad (22)$$

Assume the following.

$$\forall X0.\forall X1.k2\_tarski\ X0\ X1 = k2\_tarski\ X1\ X0 \quad (23)$$

Assume the following.

$$\forall X0.(v1\_xboole\_0\ X0)\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ (k1\_zfmisc\_1\ X0))\Rightarrow(v1\_xboole\_0\ X1)) \quad (24)$$

**Theorem 1**

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\forall X1.(m1\_subset\_1\ X1\ k5\_numbers)\Rightarrow(\forall X2.(m2\_subset\_1\ X2\ (k6\_qc\_lang1\ X0)\ (k8\_qc\_lang1\ X0\ X1))\Rightarrow(\forall X3.((v5\_relat\_1\ X3\ (k3\_qc\_lang1\ X0))\wedge((v3\_card\_1\ X3\ X1)\wedge(m2\_finseq\_1\ X3\ (k2\_qc\_lang1\ X0))))\Rightarrow(\forall X4.(m1\_subset\_1\ X4\ (k1\_subst1\ X0))\Rightarrow(\exists X5.(m2\_subset\_1\ X5\ (k16\_subst1\ X0)\ (k38\_subst1\ X0))\wedge((k2\_sublemma\ X0\ X5 = k4\_cqc\_lang\ X1\ X0\ X2\ X3)\wedge(k19\_subst1\ X0\ X5 = X4)))))))$$