

## t33\_substut1

(TMY9QsDuQfJvtXGpiKXDBC9mQYQCvY6Acbd)

October 27, 2020

Let  $m1\_qc\_lang1 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k16\_substut1 : \iota \Rightarrow \iota$  be given. Let  $v2\_substut1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k37\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k3\_cqc\_lang : \iota \Rightarrow \iota$  be given. Let  $k5\_cqc\_lang : \iota \Rightarrow \iota$  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  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v4\_substut1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k10\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k16\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k18\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k26\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k19\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v5\_substut1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k13\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k27\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v6\_substut1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k14\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k28\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k29\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v7\_substut1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k36\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k31\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (m2\_subset\_1 (k5\_cqc\_lang X0) (k9\_qc\_lang1 X0) (k3\_cqc\_lang X0)) \quad (1)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0) \wedge (m1\_subset\_1 X1 (k16\_substut1 X0))) \Rightarrow (m1\_subset\_1 (k37\_substut1 X0 X1) (k9\_qc\_lang1 X0)) \quad (2)$$

Assume the following.

$$\begin{aligned}
& \forall X0.(m1\_qc\_lang1\ X0) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ (k16\_subst1 \\
& X0)) \Rightarrow (\forall X2.(m1\_subset\_1\ X2\ (k9\_qc\_lang1\ X0)) \Rightarrow ((X2 = k37\_subst1 \\
& X0\ X1) \Leftrightarrow (\exists X3.((v1\_funct\_1\ X3) \wedge ((v1\_funct\_2\ X3\ (k16\_subst1 \\
& X0)\ (k9\_qc\_lang1\ X0)) \wedge (m1\_subset\_1\ X3\ (k1\_zfmisc\_1\ (k2\_zfmisc\_1 \\
& (k16\_subst1\ X0)\ (k9\_qc\_lang1\ X0)))))) \wedge ((X2 = k3\_funct\_2\ (k16\_subst1 \\
& X0)\ (k9\_qc\_lang1\ X0)\ X3\ X1) \wedge (\forall X4.(m1\_subset\_1\ X4\ (k16\_subst1 \\
& X0)) \Rightarrow (((v2\_subst1\ X4\ X0) \Rightarrow (k3\_funct\_2\ (k16\_subst1\ X0)\ (k9\_qc\_lang1 \\
& X0)\ X3\ X4 = k5\_cqc\_lang\ X0)) \wedge (((v4\_subst1\ X4\ X0) \Rightarrow (k3\_funct\_2 \\
& (k16\_subst1\ X0)\ (k9\_qc\_lang1\ X0)\ X3\ X4 = k10\_qc\_lang1\ X0\ (k16\_qc\_lang1 \\
& X0\ (k18\_subst1\ X0\ X4))\ (k3\_subst1\ X0\ (k26\_subst1\ X0\ X4))\ (k19\_subst1 \\
& X0\ X4)))) \wedge (((v5\_subst1\ X4\ X0) \Rightarrow (k3\_funct\_2\ (k16\_subst1\ X0) \\
& (k9\_qc\_lang1\ X0)\ X3\ X4 = k13\_qc\_lang1\ X0\ (k3\_funct\_2\ (k16\_subst1 \\
& X0)\ (k9\_qc\_lang1\ X0)\ X3\ (k27\_subst1\ X0\ X4)))) \wedge (((v6\_subst1 \\
& X4\ X0) \Rightarrow (k3\_funct\_2\ (k16\_subst1\ X0)\ (k9\_qc\_lang1\ X0)\ X3\ X4 = k14\_qc\_lang1 \\
& X0\ (k3\_funct\_2\ (k16\_subst1\ X0)\ (k9\_qc\_lang1\ X0)\ X3\ (k28\_subst1 \\
& X0\ X4))\ (k3\_funct\_2\ (k16\_subst1\ X0)\ (k9\_qc\_lang1\ X0)\ X3\ (k29\_subst1 \\
& X0\ X4)))) \wedge (((v7\_subst1\ X4\ X0) \Rightarrow (k3\_funct\_2\ (k16\_subst1\ X0) \\
& (k9\_qc\_lang1\ X0)\ X3\ X4 = k36\_subst1\ X0\ X4\ (k3\_funct\_2\ (k16\_subst1 \\
& X0)\ (k9\_qc\_lang1\ X0)\ X3\ (k31\_subst1\ X0\ X4)))))))))))))
\end{aligned} \tag{3}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.(m1\_qc\_lang1\ X0) \Rightarrow (\forall X1.(m1\_subset\_1\ X1\ (k16\_subst1 \\
& X0)) \Rightarrow ((v2\_subst1\ X1\ X0) \Rightarrow (m2\_subset\_1\ (k37\_subst1\ X0\ X1)\ ( \\
& k9\_qc\_lang1\ X0)\ (k3\_cqc\_lang\ X0))))
\end{aligned}$$