

# t9\_gfacirc2 (TMTBgRNcWYG- cLqx3pKEUpQpCTcE9U9TL94A)

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Let  $v7\_ordinal1 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_finseq\_1 : \iota \Rightarrow o$  be given. Let  $k3\_msafree2 : \iota \Rightarrow \iota$  be given. Let  $k1\_gfacirc2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_nat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_1 : \iota$  be given. Let  $k2\_xboole\_0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k13\_gfacirc1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_gfacirc2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_circcomb : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_gfacirc2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_circcomb : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k14\_gfacirc1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_gfacirc1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_circcomb : \iota \Rightarrow o$  be given. Let  $v2\_circcomb : \iota \Rightarrow o$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v3\_circcomb : \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0.(v7\_ordinal1 X0) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge (( \\
& \quad v1\_funct\_1 X1) \wedge (v1\_finseq\_1 X1))) \Rightarrow (\forall X2.((v1\_relat\_1 \\
& \quad X2) \wedge ((v1\_funct\_1 X2) \wedge (v1\_finseq\_1 X2))) \Rightarrow ((k1\_gfacirc2 (k1\_nat\_1 \\
& \quad X0 np\_1) X1 X2 = k2\_circcomb (k1\_gfacirc2 X0 X1 X2) (k13\_gfacirc1 \\
& \quad (k1\_funct\_1 X1 (k1\_nat\_1 X0 np\_1)) (k1\_funct\_1 X2 (k1\_nat\_1 X0 \\
& \quad np\_1)) (k3\_gfacirc2 X0 X1 X2))) \wedge ((k2\_gfacirc2 (k1\_nat\_1 X0 np\_1) \\
& \quad X1 X2 = k3\_circcomb (k1\_gfacirc2 X0 X1 X2) (k13\_gfacirc1 (k1\_funct\_1 \\
& \quad X1 (k1\_nat\_1 X0 np\_1)) (k1\_funct\_1 X2 (k1\_nat\_1 X0 np\_1)) (k3\_gfacirc2 \\
& \quad X0 X1 X2)) (k2\_gfacirc2 X0 X1 X2) (k14\_gfacirc1 (k1\_funct\_1 X1 (k1\_nat\_1 \\
& \quad X0 np\_1)) (k1\_funct\_1 X2 (k1\_nat\_1 X0 np\_1)) (k3\_gfacirc2 X0 X1 \\
& \quad X2))) \wedge (k3\_gfacirc2 (k1\_nat\_1 X0 np\_1) X1 X2 = k9\_gfacirc1 (k1\_funct\_1 \\
& \quad X1 (k1\_nat\_1 X0 np\_1)) (k1\_funct\_1 X2 (k1\_nat\_1 X0 np\_1)) (k3\_gfacirc2 \\
& \quad X0 X1 X2))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v1\_circcomb X0) \wedge ((v2\_circcomb \\
& \quad X0) \wedge (l1\_msualg\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v1\_circcomb \\
& \quad X1) \wedge ((v2\_circcomb X1) \wedge (l1\_msualg\_1 X1)))) \Rightarrow (k3\_msafree2 (k2\_circcomb \\
& \quad X0 X1) = k2\_xboole\_0 (k3\_msafree2 X0) (k3\_msafree2 X1)))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. ((v7\_ordinal1\ X0) \wedge (((v1\_relat\_1 \\ & X1) \wedge ((v1\_funct\_1\ X1) \wedge (v1\_finseq\_1\ X1))) \wedge ((v1\_relat\_1\ X2) \wedge \\ & (v1\_funct\_1\ X2) \wedge (v1\_finseq\_1\ X2)))) \Rightarrow ((\neg v2\_struct\_0\ (k1\_gfacirc2 \\ & X0\ X1\ X2)) \wedge ((\neg v11\_struct\_0\ (k1\_gfacirc2\ X0\ X1\ X2)) \wedge ((v1\_msualg\_1 \\ & (k1\_gfacirc2\ X0\ X1\ X2)) \wedge ((v1\_circcomb\ (k1\_gfacirc2\ X0\ X1\ X2)) \wedge \\ & ((v2\_circcomb\ (k1\_gfacirc2\ X0\ X1\ X2)) \wedge ((v3\_circcomb\ (k1\_gfacirc2 \\ & X0\ X1\ X2)) \wedge (l1\_msualg\_1\ (k1\_gfacirc2\ X0\ X1\ X2)))))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (\neg v2\_struct\_0\ (k13\_gfacirc1 \\ & X0\ X1\ X2)) \wedge ((\neg v11\_struct\_0\ (k13\_gfacirc1\ X0\ X1\ X2)) \wedge ((v1\_msualg\_1 \\ & (k13\_gfacirc1\ X0\ X1\ X2)) \wedge ((v1\_circcomb\ (k13\_gfacirc1\ X0\ X1\ X2)) \wedge \\ & ((v2\_circcomb\ (k13\_gfacirc1\ X0\ X1\ X2)) \wedge ((v3\_circcomb\ (k13\_gfacirc1 \\ & X0\ X1\ X2)) \wedge (l1\_msualg\_1\ (k13\_gfacirc1\ X0\ X1\ X2)))))))) \end{aligned} \quad (4)$$

**Theorem 1**

$$\begin{aligned} & \forall X0. (v7\_ordinal1\ X0) \Rightarrow (\forall X1. ((v1\_relat\_1\ X1) \wedge (( \\ & v1\_funct\_1\ X1) \wedge (v1\_finseq\_1\ X1))) \Rightarrow (\forall X2. ((v1\_relat\_1 \\ & X2) \wedge ((v1\_funct\_1\ X2) \wedge (v1\_finseq\_1\ X2))) \Rightarrow (k3\_msafree2\ (k1\_gfacirc2 \\ & (k1\_nat\_1\ X0\ np\_1)\ X1\ X2) = k2\_xboole\_0\ (k3\_msafree2\ (k1\_gfacirc2 \\ & X0\ X1\ X2))\ (k3\_msafree2\ (k13\_gfacirc1\ (k1\_funct\_1\ X1\ (k1\_nat\_1 \\ & X0\ np\_1))\ (k1\_funct\_1\ X2\ (k1\_nat\_1\ X0\ np\_1))\ (k3\_gfacirc2\ X0\ X1 \\ & X2)))))) \end{aligned}$$