

thm_2Einteger__word_2Ew2i__n2w__mod
 (TMQyL6hVb8VZqDRDonoEvJhTzFsVmNgNQp)

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Definition 1 We define $c_2Emin_2E_40$ to be $\lambda A. \lambda P \in 2^A. \text{if } (\exists x \in A. p (ap P x)) \text{ then } (\text{the } (\lambda x. x \in A \wedge p \text{ of type } \iota \Rightarrow \iota)$.

Definition 2 We define $c_2Emin_2E_3D$ to be $\lambda A. \lambda x \in A. \lambda y \in A. inj_o (x = y) \text{ of type } \iota \Rightarrow \iota$.

Definition 3 We define $c_2Ebool_2E_3F$ to be $\lambda A. \lambda a : \iota. (\lambda V0P \in (2^{A-27a}). (ap V0P (ap (c_2Emin_2E_40 A$

Definition 4 We define $c_2Emin_2E_3D_3D_3E$ to be $\lambda P \in 2. \lambda Q \in 2. inj_o (p P \Rightarrow p Q) \text{ of type } \iota$.

Definition 5 We define c_2Ebool_2ET to be $(ap (ap (c_2Emin_2E_3D (2^2)) (\lambda V0x \in 2. V0x)) (\lambda V1x \in 2. V1x))$

Definition 6 We define $c_2Ebool_2E_21$ to be $\lambda A. \lambda a : \iota. (\lambda V0P \in (2^{A-27a}). (ap (ap (c_2Emin_2E_3D (2^{A-27a})$

Definition 7 We define $c_2Ebool_2E_5C_2F$ to be $(\lambda V0t1 \in 2. (\lambda V1t2 \in 2. (ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.$

Definition 8 We define $c_2Ebool_2EBOUNDED$ to be $(\lambda V0v \in 2. c_2Ebool_2ET)$.

Let $ty_2Einteger_2Eint : \iota$ be given. Assume the following.

$$\text{nonempty } ty_2Einteger_2Eint \quad (1)$$

Let $ty_2Enum_2Enum : \iota$ be given. Assume the following.

$$\text{nonempty } ty_2Enum_2Enum \quad (2)$$

Let $c_2Einteger_2Eint_of_num : \iota$ be given. Assume the following.

$$c_2Einteger_2Eint_of_num \in (ty_2Einteger_2Eint^{ty_2Enum_2Enum}) \quad (3)$$

Definition 9 We define $c_2Einteger_2EEnum$ to be $\lambda V0i \in ty_2Einteger_2Eint. (ap (c_2Emin_2E_40 ty_2Enum$

Let $ty_2Epair_2Eprod : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A0.\text{nonempty } A0 \Rightarrow \forall A1.\text{nonempty } A1 \Rightarrow \text{nonempty } (ty_2Epair_2Eprod \\ A0 A1) \end{aligned} \quad (4)$$

Let $c_2Einteger_2Eint_REP_CLASS : \iota$ be given. Assume the following.

$$c_2Einteger_2Eint_REP_CLASS \in ((2^{(ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)})ty_2Einteger_2Eint_REP_CLASS) \quad (5)$$

Definition 10 We define $c_2Einteger_2Eint_REP$ to be $\lambda V0a \in ty_2Einteger_2Eint.(ap (c_2Emin_2E_40 (t$

Let $c_2Einteger_2Etint_mul : \iota$ be given. Assume the following.

$$c_2Einteger_2Etint_mul \in (((ty_2Epair_2Eprod ty_2Enum_2Enum \\ ty_2Enum_2Enum)(ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)) (ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)) \quad (6)$$

Let $c_2Einteger_2Etint_eq : \iota$ be given. Assume the following.

$$c_2Einteger_2Etint_eq \in ((2^{(ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)}) (ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)) \quad (7)$$

Let $c_2Einteger_2Eint_ABS_CLASS : \iota$ be given. Assume the following.

$$c_2Einteger_2Eint_ABS_CLASS \in (ty_2Einteger_2Eint)^{(2^{(ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)})} \quad (8)$$

Definition 11 We define $c_2Einteger_2Eint_ABS$ to be $\lambda V0r \in (ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum) . r$

Definition 12 We define $c_2Einteger_2Eint_mul$ to be $\lambda V0T1 \in ty_2Einteger_2Eint. \lambda V1T2 \in ty_2Einteger_2Eint . T1 * T2$

Let $c_2Einteger_2Etint_add : \iota$ be given. Assume the following.

$$c_2Einteger_2Etint_add \in (((ty_2Epair_2Eprod ty_2Enum_2Enum \\ ty_2Enum_2Enum)(ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)) (ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)) \quad (9)$$

Definition 13 We define $c_2Einteger_2Eint_add$ to be $\lambda V0T1 \in ty_2Einteger_2Eint. \lambda V1T2 \in ty_2Einteger_2Eint . T1 + T2$

Let $c_2Einteger_2Etint_neg : \iota$ be given. Assume the following.

$$c_2Einteger_2Etint_neg \in ((ty_2Epair_2Eprod ty_2Enum_2Enum \\ ty_2Enum_2Enum)(ty_2Epair_2Eprod ty_2Enum_2Enum ty_2Enum_2Enum)) \quad (10)$$

Definition 14 We define $c_2Einteger_2Eint_neg$ to be $\lambda V0T1 \in ty_2Einteger_2Eint. (ap c_2Einteger_2Eint_neg T1)$

Definition 15 We define $c_2Einteger_2Eint_sub$ to be $\lambda V0x \in ty_2Einteger_2Eint. \lambda V1y \in ty_2Einteger_2Eint . T1 - T2$

Let $c_2Einteger_2Eint_exp : \iota$ be given. Assume the following.

$$c_2Einteger_2Eint_exp \in ((ty_2Einteger_2Eint^{ty_2Enum_2Enum})^{ty_2Einteger_2Eint}) \quad (11)$$

Let $c_2Earithmetic_2EMOD : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EMOD \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (12)$$

Let $c_2Einteger_2Eint_mod : \iota$ be given. Assume the following.

$$c_2Einteger_2Eint_mod \in ((ty_2Einteger_2Eint^{ty_2Einteger_2Eint})^{ty_2Einteger_2Eint}) \quad (13)$$

Let $c_2Enum_2EZERO_REP : \iota$ be given. Assume the following.

$$c_2Enum_2EZERO_REP \in \omega \quad (14)$$

Let $c_2Enum_2EABS_num : \iota$ be given. Assume the following.

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \quad (15)$$

Definition 16 We define c_2Enum_2E0 to be $(ap\ c_2Enum_2EABS_num\ c_2Enum_2EZERO_REP)$.

Definition 17 We define $c_2Earithmetic_2EZERO$ to be c_2Enum_2E0 .

Let $c_2Enum_2EREP_num : \iota$ be given. Assume the following.

$$c_2Enum_2EREP_num \in (\omega^{\omega}) \quad (16)$$

Let $c_2Enum_2ESUC_REP : \iota$ be given. Assume the following.

$$c_2Enum_2ESUC_REP \in (\omega^{\omega}) \quad (17)$$

Definition 18 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum.(ap\ c_2Enum_2EABS_num\ m)$

Let $c_2Earithmetic_2E_2B : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E_2B \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (18)$$

Definition 19 We define $c_2Earithmetic_2EBIT1$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap\ (ap\ c_2Earithmetic_2E_2B\ n)\ 0)$

Definition 20 We define $c_2Earithmetic_2ENUMERAL$ to be $\lambda V0x \in ty_2Enum_2Enum.V0x$.

Definition 21 We define $c_2Earithmetic_2EBIT2$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap\ (ap\ c_2Earithmetic_2E_2B\ n)\ 1)$

Let $c_2Earithmetic_2EEEXP : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EEEXP \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (19)$$

Let $c_2Earithmetic_2EDIV : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EDIV \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (20)$$

Definition 22 We define $c_2Ebit_2EDIV_2EXP$ to be $\lambda V0x \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum.$

Let $c_2Earithmetic_2E_2D : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E_2D \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (21)$$

Definition 23 We define $c_2Ebit_2EMOD_2EXP$ to be $\lambda V0x \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum.$

Definition 24 We define c_2Ebit_2EBITS to be $\lambda V0h \in ty_2Enum_2Enum. \lambda V1l \in ty_2Enum_2Enum. \lambda V2t \in$

Definition 25 We define c_2Ebit_2EBIT to be $\lambda V0b \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. (ap$

Let $ty_2Efcp_2Efinite_image : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Efcp_2Efinite_image A0) \quad (22)$$

Let $ty_2Ebool_2Eitself : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Ebool_2Eitself A0) \quad (23)$$

Let $c_2Ebool_2Ethethe_value : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Ebool_2Ethethe_value A_27a \in (ty_2Ebool_2Eitself A_27a) \quad (24)$$

Let $c_2Efcp_2Edimindex : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Efcp_2Edimindex A_27a \in (ty_2Enum_2Enum^{(ty_2Ebool_2Eitself A_27a)}) \quad (25)$$

Definition 26 We define c_2Ebool_2EF to be $(ap (c_2Ebool_2E_21 2) (\lambda V0t \in 2. V0t)).$

Definition 27 We define $c_2Ebool_2E_7E$ to be $(\lambda V0t \in 2. (ap (ap c_2Emin_2E_3D_3D_3E V0t) c_2Ebool_2E_7E))$

Definition 28 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2. (\lambda V1t2 \in 2. (ap (c_2Ebool_2E_21 2) (\lambda V2t \in$

Definition 29 We define $c_2Eprim_rec_2E_3C$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum.$

Definition 30 We define $c_2Ebool_2E_3F_21$ to be $\lambda A_27a : \iota. (\lambda V0P \in (2^{A_27a}). (ap (ap c_2Ebool_2E_2F_5C$

Definition 31 We define $c_2Efcp_2Efinite_index$ to be $\lambda A_27a : \iota. (ap (c_2Emin_2E_40 (A_27a^{ty_2Enum_2Enum}))$

Let $ty_2Efcp_2Ecart : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A0.nonempty A0 \Rightarrow \forall A1.nonempty A1 \Rightarrow nonempty (ty_2Efcp_2Ecart \\ A0 A1) \end{aligned} \quad (26)$$

Let $c_2Efcp_2Edest_cart : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A_27a.nonempty A_27a \Rightarrow \forall A_27b.nonempty A_27b \Rightarrow c_2Efcp_2Edest_cart \\ A_27a A_27b \in ((A_27a^{(ty_2Efcp_2Efinite_image A_27b)})^{(ty_2Efcp_2Ecart A_27a A_27b)}) \end{aligned} \quad (27)$$

Definition 32 We define $c_2Efcp_2Efcp_index$ to be $\lambda A_27a : \iota. \lambda A_27b : \iota. \lambda V0x \in (ty_2Efcp_2Ecart\ A_27a)$

Definition 33 We define c_2Efcp_2EFCP to be $\lambda A_27a : \iota. \lambda A_27b : \iota. (\lambda V0g \in (A_27a^{ty_2Enum_2Enum}).(ap\ (ap\ (c_2Efcp_2EFCP\ A_27a)\ V0g)\ A_27b))$

Definition 34 We define $c_2Ewords_2En2w$ to be $\lambda A_27a : \iota. \lambda V0n \in ty_2Enum_2Enum.(ap\ (c_2Efcp_2EFCP\ A_27a)\ V0n)$

Definition 35 We define c_2Ebool_2ECOND to be $\lambda A_27a : \iota. (\lambda V0t \in 2.(\lambda V1t1 \in A_27a.(\lambda V2t2 \in A_27a.(ap\ (c_2Efcp_2EFCP\ A_27a)\ V1t1)\ V2t2)))$

Definition 36 We define c_2Ebit_2ESBIT to be $\lambda V0b \in 2. \lambda V1n \in ty_2Enum_2Enum.(ap\ (ap\ (ap\ (c_2Ebool_2ECOND\ V0b)\ V1n)\ V0b))$

Let $c_2Esum_num_2ESUM : \iota$ be given. Assume the following.

$$c_2Esum_num_2ESUM \in ((ty_2Enum_2Enum^{(ty_2Enum_2Enum^{ty_2Enum_2Enum})})^{ty_2Enum_2Enum}) \quad (28)$$

Definition 37 We define $c_2Ewords_2Ew2n$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart\ 2\ A_27a).(ap\ (ap\ (c_2Efcp_2EFCP\ A_27a)\ V0w)\ A_27a)$

Let $c_2Ewords_2Edimword : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a. nonempty\ A_27a \Rightarrow c_2Ewords_2Edimword\ A_27a \in (ty_2Enum_2Enum^{(ty_2Ebool_2Eitself\ A_27a)}) \quad (29)$$

Definition 38 We define $c_2Ewords_2Eword_2comp$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart\ 2\ A_27a).$

Definition 39 We define $c_2Ewords_2Eword_msb$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart\ 2\ A_27a).$

Definition 40 We define $c_2Einteger_word_2Ew2i$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart\ 2\ A_27a).$

Let $c_2Ewords_2EINT_MIN : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a. nonempty\ A_27a \Rightarrow c_2Ewords_2EINT_MIN\ A_27a \in (ty_2Enum_2Enum^{(ty_2Ebool_2Eitself\ A_27a)}) \quad (30)$$

Let $c_2Earithmetic_2EEVEN : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EEVEN \in (2^{ty_2Enum_2Enum}) \quad (31)$$

Let $c_2Earithmetic_2EODD : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EODD \in (2^{ty_2Enum_2Enum}) \quad (32)$$

Definition 41 We define $c_2Earithmetic_2E_3E$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. ap\ (c_2Earithmetic_2EODD\ V0m)\ V1n$

Definition 42 We define $c_2Earithmetic_2E_3E_3D$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. ap\ (c_2Earithmetic_2EODD\ V0m)\ V1n$

Definition 43 We define $c_2Eprim_rec_2EPRE$ to be $\lambda V0m \in ty_2Enum_2Enum.(ap\ (ap\ (ap\ (c_2Ebool_2ECOND\ V0m)\ V0m)\ V0m)\ V0m)$

Let $c_2Earithmetic_2E_2A : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E_2A \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (33)$$

Definition 44 We define $c_2Enumeral_2EiiSUC$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap\ c_2Enum_2ESUC\ (ap\ c_2Eprim_rec_2EPRE\ V0n)\ V0n)$

Definition 45 We define $c_2E\text{numeral_2EiZ}$ to be $\lambda V0x \in ty_2Enum_2Enum. V0x$.

Definition 46 We define $c_2Earithmetic_2E_3C_3D$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum.$

Assume the following.

$$\begin{aligned} & (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. ((ap (ap c_2Earithmetic_2E_2B c_2Enum_2E0) V0m) = V0m) \wedge (((ap (ap c_2Earithmetic_2E_2B V0m) c_2Enum_2E0) = V0m) \wedge (((ap (ap c_2Earithmetic_2E_2B (ap c_2Enum_2ESUC V0m)) V1n) = (ap c_2Enum_2ESUC (ap (ap c_2Earithmetic_2E_2B V0m) V1n))) \wedge ((ap (ap c_2Earithmetic_2E_2B V0m) (ap c_2Enum_2ESUC V1n)) = (ap c_2Enum_2ESUC (ap (ap c_2Earithmetic_2E_2B V0m) V1n))))))) \\ & \end{aligned} \quad (34)$$

Assume the following.

$$\begin{aligned} & (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. ((ap (ap c_2Earithmetic_2E_2B V0m) V1n) = (ap (ap c_2Earithmetic_2E_2B V1n) V0m)))) \\ & \end{aligned} \quad (35)$$

Assume the following.

$$\begin{aligned} & (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. (\forall V2p \in ty_2Enum_2Enum. ((ap (ap c_2Earithmetic_2E_2B V0m) (ap (ap c_2Earithmetic_2E_2B V1n) V2p)) = (ap (ap c_2Earithmetic_2E_2B (ap (ap c_2Earithmetic_2E_2B V0m) V1n)) V2p))))))) \\ & \end{aligned} \quad (36)$$

Assume the following.

$$\begin{aligned} & (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. ((p (ap (ap c_2Eprim_rec_2E_3C V0m) V1n)) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Enum_2ESUC V0m)) V1n))))))) \\ & \end{aligned} \quad (37)$$

Assume the following.

$$(\forall V0n \in ty_2Enum_2Enum. (p (ap (ap c_2Earithmetic_2E_3C_3D c_2Enum_2E0) V0n))) \quad (38)$$

Assume the following.

$$\begin{aligned} & (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. ((\neg(p (ap (ap c_2Eprim_rec_2E_3C V0m) V1n))) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D V1n) V0m))))))) \\ & \end{aligned} \quad (39)$$

Assume the following.

$$\begin{aligned}
& (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2E_2A c_2Enum_2E0) V0m) = c_2Enum_2E0) \wedge \\
& (((ap (ap c_2Earithmetic_2E_2A V0m) c_2Enum_2E0) = c_2Enum_2E0) \wedge \\
& (((ap (ap c_2Earithmetic_2E_2A (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO))) V0m) = V0m) \wedge \\
& (((ap (ap c_2Earithmetic_2E_2A V0m) (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO))) = V0m) \wedge \\
& ((ap (ap c_2Earithmetic_2E_2A (ap c_2Enum_2ESUC V0m)) V1n) = (ap \\
& (ap c_2Earithmetic_2E_2B (ap (ap c_2Earithmetic_2E_2A V0m) V1n)) \\
& V1n)) \wedge ((ap (ap c_2Earithmetic_2E_2A V0m) (ap c_2Enum_2ESUC V1n)) = \\
& (ap (ap c_2Earithmetic_2E_2B V0m) (ap (ap c_2Earithmetic_2E_2A \\
& V0m) V1n)))))))
\end{aligned} \tag{40}$$

Assume the following.

$$\begin{aligned}
& (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. \\
& (ap (ap c_2Earithmetic_2E_2A V0m) V1n) = (ap (ap c_2Earithmetic_2E_2A \\
& V1n) V0m)))
\end{aligned} \tag{41}$$

Assume the following.

$$\begin{aligned}
& (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. \\
& \forall V2p \in ty_2Enum_2Enum. (((p (ap (ap c_2Earithmetic_2E_3C_3D \\
& V0m) V1n)) \wedge (p (ap (ap c_2Earithmetic_2E_3C_3D V1n) V2p))) \Rightarrow (p \\
& (ap (ap c_2Earithmetic_2E_3C_3D V0m) V2p))))
\end{aligned} \tag{42}$$

Assume the following.

$$\begin{aligned}
& (\forall V0p \in ty_2Enum_2Enum. (\forall V1q \in ty_2Enum_2Enum. \\
& \forall V2n \in ty_2Enum_2Enum. ((ap (ap c_2Earithmetic_2EEEXP V2n) \\
& (ap (ap c_2Earithmetic_2E_2B V0p) V1q)) = (ap (ap c_2Earithmetic_2E_2A \\
& (ap (ap c_2Earithmetic_2EEEXP V2n) V0p)) (ap (ap c_2Earithmetic_2EEEXP \\
& V2n) V1q))))))
\end{aligned} \tag{43}$$

Assume the following.

$$\begin{aligned}
& (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. \\
& (p (ap (ap c_2Earithmetic_2E_3C_3D V0m) V1n)) \Rightarrow (\exists V2p \in ty_2Enum_2Enum. \\
& (V1n = (ap (ap c_2Earithmetic_2E_2B V0m) V2p)))))
\end{aligned} \tag{44}$$

Assume the following.

$$\begin{aligned}
& (\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. \\
& \forall V2p \in ty_2Enum_2Enum. ((p (ap (ap c_2Earithmetic_2E_3C_3D \\
& (ap (ap c_2Earithmetic_2E_2B V0m) V1n)) (ap (ap c_2Earithmetic_2E_2B \\
& V0m) V2p))) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D V1n) V2p))))
\end{aligned} \tag{45}$$

Assume the following.

$$(\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. ((\neg(p (ap (ap c_2Earithmetic_2E_3C_3D V0m) V1n))) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Enum_2ESUC V1n)) V0m)))))) \quad (46)$$

Assume the following.

$$(\forall V0n \in ty_2Enum_2Enum. ((ap c_2Enum_2ESUC V0n) = (ap (ap c_2Earithmetic_2E_2B (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)) V0n)))) \quad (47)$$

Assume the following.

$$(\forall V0n \in ty_2Enum_2Enum. ((p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) V0n)) \Rightarrow (\forall V1k \in ty_2Enum_2Enum. ((ap (ap c_2Earithmetic_2EMOD (ap (ap c_2Earithmetic_2E_2A V1k) V0n)) V0n) = c_2Enum_2E0)))) \quad (48)$$

Assume the following.

$$(\forall V0n \in ty_2Enum_2Enum. ((p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) V0n)) \Rightarrow (\forall V1k \in ty_2Enum_2Enum. ((ap (ap c_2Earithmetic_2EMOD (ap (ap c_2Earithmetic_2EMOD V1k) V0n)) V0n) = (ap (ap c_2Earithmetic_2EMOD V1k) V0n)))))) \quad (49)$$

Assume the following.

$$(\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. (((ap (ap c_2Earithmetic_2EEEXP V0n) V1m) = c_2Enum_2E0) \Leftrightarrow ((V0n = c_2Enum_2E0) \wedge (p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) V1m)))))) \quad (50)$$

Assume the following.

$$(\forall V0x \in ty_2Enum_2Enum. (\forall V1y \in ty_2Enum_2Enum. (((p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) (ap (ap c_2Earithmetic_2EEEXP V0x) V1y))) \Leftrightarrow ((p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) V0x)) \vee (V1y = c_2Enum_2E0)))))) \quad (51)$$

Assume the following.

$$(\forall V0b1 \in ty_2Enum_2Enum. (\forall V1b2 \in ty_2Enum_2Enum. ((\forall V2x \in ty_2Enum_2Enum. (((ap (ap c_2Earithmetic_2EEEXP V0b1) V2x) = (ap (ap c_2Earithmetic_2EEEXP V1b2) V2x)) \Leftrightarrow ((V2x = c_2Enum_2E0) \vee (V0b1 = V1b2))))))) \quad (52)$$

Assume the following.

$$True \quad (53)$$

Assume the following.

$$(\forall V0t1 \in 2. (\forall V1t2 \in 2. (((p V0t1) \Rightarrow (p V1t2)) \Rightarrow (((p V1t2) \Rightarrow (p V0t1)) \Rightarrow ((p V0t1) \Leftrightarrow (p V1t2)))))) \quad (54)$$

Assume the following.

$$(\forall V0t \in 2. (False \Rightarrow (p V0t))) \quad (55)$$

Assume the following.

$$(\forall V0t \in 2. ((p V0t) \vee (\neg(p V0t)))) \quad (56)$$

Assume the following.

$$\forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0t \in 2. ((\forall V1x \in A_27a. (p V0t) \Leftrightarrow (p V0t)))) \quad (57)$$

Assume the following.

$$(\forall V0t \in 2. (((True \wedge (p V0t)) \Leftrightarrow (p V0t)) \wedge (((p V0t) \wedge True) \Leftrightarrow (p V0t)) \wedge (((False \wedge (p V0t)) \Leftrightarrow False) \wedge (((p V0t) \wedge False) \Leftrightarrow False) \wedge (((p V0t) \wedge (p V0t)) \Leftrightarrow (p V0t)))))) \quad (58)$$

Assume the following.

$$(\forall V0t \in 2. (((True \vee (p V0t)) \Leftrightarrow True) \wedge (((p V0t) \vee True) \Leftrightarrow True) \wedge (((False \vee (p V0t)) \Leftrightarrow (p V0t)) \wedge (((p V0t) \vee False) \Leftrightarrow (p V0t)) \wedge (((p V0t) \vee (p V0t)) \Leftrightarrow (p V0t)))))) \quad (59)$$

Assume the following.

$$((\forall V0t \in 2. ((\neg(\neg(p V0t)) \Leftrightarrow (p V0t))) \wedge (((\neg True) \Leftrightarrow False) \wedge ((\neg False) \Leftrightarrow True)))) \quad (60)$$

Assume the following.

$$\forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0x \in A_27a. ((V0x = V0x) \Leftrightarrow True)) \quad (61)$$

Assume the following.

$$\forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0x \in A_27a. (\forall V1y \in A_27a. ((V0x = V1y) \Leftrightarrow (V1y = V0x)))) \quad (62)$$

Assume the following.

$$(\forall V0t \in 2. (((True \Leftrightarrow (p V0t)) \Leftrightarrow (p V0t)) \wedge (((p V0t) \Leftrightarrow True) \Leftrightarrow (p V0t)) \wedge (((False \Leftrightarrow (p V0t)) \Leftrightarrow (\neg(p V0t))) \wedge (((p V0t) \Leftrightarrow False) \Leftrightarrow (\neg(p V0t)))))) \quad (63)$$

Assume the following.

$$(\forall V0A \in 2. (\forall V1B \in 2. (((\neg((p V0A) \wedge (p V1B))) \Leftrightarrow ((\neg(p V0A)) \vee (\neg(p V1B)))) \wedge ((\neg((p V0A) \vee (p V1B))) \Leftrightarrow ((\neg(p V0A)) \wedge (\neg(p V1B))))))) \quad (64)$$

Assume the following.

$$(\forall V0A \in 2. (\forall V1B \in 2. (((p V0A) \Rightarrow (p V1B)) \Leftrightarrow ((\neg(p V0A)) \vee (p V1B)))))) \quad (65)$$

Assume the following.

$$(\forall V0t \in 2. (((p V0t) \Rightarrow False) \Leftrightarrow ((p V0t) \Leftrightarrow False))) \quad (66)$$

Assume the following.

$$(\forall V0t1 \in 2. (\forall V1t2 \in 2. (\forall V2t3 \in 2. (((p V0t1) \Rightarrow ((p V1t2) \Rightarrow (p V2t3))) \Leftrightarrow (((p V0t1) \wedge (p V1t2)) \Rightarrow (p V2t3)))))) \quad (67)$$

Assume the following.

$$(\forall V0v \in 2. ((p (ap c_2Ebool_2EBOUNDED V0v)) \Leftrightarrow True)) \quad (68)$$

Assume the following.

$$\begin{aligned} & (\forall V0x \in ty_2Einteger_2Eint. (\forall V1y \in ty_2Einteger_2Eint. \\ & (\forall V2z \in ty_2Einteger_2Eint. ((ap (ap c_2Einteger_2Eint_sub \\ & V0x) (ap (ap c_2Einteger_2Eint_sub V1y) V2z)) = (ap (ap c_2Einteger_2Eint_sub \\ & (ap (ap c_2Einteger_2Eint_add V0x) V2z)) V1y)))))) \end{aligned} \quad (69)$$

Assume the following.

$$(\forall V0x \in ty_2Einteger_2Eint. ((ap (ap c_2Einteger_2Eint_mul \\ & (ap c_2Einteger_2Eint_of_num (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))) V0x) = V0x)) \quad (70)$$

Assume the following.

$$(\forall V0m \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. ((ap c_2Einteger_2Eint_of_num V0m) = (ap c_2Einteger_2Eint_of_num V1n)) \Leftrightarrow (V0m = V1n))) \quad (71)$$

Assume the following.

$$(\forall V0x \in ty_2Einteger_2Eint. ((ap (ap c_2Einteger_2Eint_sub \\ & V0x) (ap c_2Einteger_2Eint_of_num c_2Enum_2E0)) = V0x)) \quad (72)$$

Assume the following.

$$\begin{aligned} & (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. ((p (ap (ap c_2Earithmetic_2E_3C_3D V1m) V0n)) \Rightarrow ((ap (ap c_2Einteger_2Eint_sub \\ & (ap c_2Einteger_2Eint_of_num V0n)) (ap c_2Einteger_2Eint_of_num \\ & V1m)) = (ap c_2Einteger_2Eint_of_num (ap (ap c_2Earithmetic_2E_2D \\ & V0n) V1m)))))) \end{aligned} \quad (73)$$

Assume the following.

$$(\forall V0n \in ty_2Enum_2Enum. ((ap c_2Einteger_2Enum (ap c_2Einteger_2Eint_of_num V0n)) = V0n)) \quad (74)$$

Assume the following.

$$\begin{aligned} & (\forall V0k \in ty_2Einteger_2Eint. (\forall V1q \in ty_2Einteger_2Eint. \\ & (\forall V2r \in ty_2Einteger_2Eint. ((\neg(V0k = (ap c_2Einteger_2Eint_of_num c_2Enum_2E0))) \Rightarrow ((ap (ap c_2Einteger_2Eint_mod (ap (ap c_2Einteger_2Eint_add \\ & (ap (ap c_2Einteger_2Eint_mul V1q) V0k)) V2r)) V0k) = (ap (ap c_2Einteger_2Eint_mod \\ & V2r) V0k))))))) \end{aligned} \quad (75)$$

Assume the following.

$$\begin{aligned} & (\forall V0k \in ty_2Einteger_2Eint. (\forall V1x \in ty_2Einteger_2Eint. \\ & ((\neg(V0k = (ap c_2Einteger_2Eint_of_num c_2Enum_2E0))) \Rightarrow ((ap \\ & (ap c_2Einteger_2Eint_mod (ap c_2Einteger_2Eint_neg V1x)) \\ & V0k) = (ap (ap c_2Einteger_2Eint_mod (ap (ap c_2Einteger_2Eint_sub \\ & V0k) V1x)) V0k)))))) \end{aligned} \quad (76)$$

Assume the following.

$$\begin{aligned} & (\forall V0k \in ty_2Einteger_2Eint. (\forall V1i \in ty_2Einteger_2Eint. \\ & (\forall V2j \in ty_2Einteger_2Eint. ((\neg(V0k = (ap c_2Einteger_2Eint_of_num c_2Enum_2E0))) \Rightarrow ((ap (ap c_2Einteger_2Eint_mod (ap (ap c_2Einteger_2Eint_sub \\ & (ap (ap c_2Einteger_2Eint_mod V1i) V0k)) (ap (ap c_2Einteger_2Eint_mod \\ & V2j) V0k))) V0k) = (ap (ap c_2Einteger_2Eint_mod (ap (ap c_2Einteger_2Eint_sub \\ & V1i) V2j)) V0k))))))) \end{aligned} \quad (77)$$

Assume the following.

$$\begin{aligned} & (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\ & (ap (ap c_2Einteger_2Eint_exp (ap c_2Einteger_2Eint_of_num V0n)) V1m) = (ap c_2Einteger_2Eint_of_num (ap (ap c_2Earithmetic_2EEEXP \\ & V0n) V1m)))))) \end{aligned} \quad (78)$$

Assume the following.

$$\begin{aligned}
& ((\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\
& ((\neg(V1m = c_2Enum_2E0)) \Rightarrow ((ap (ap c_2Einteger_2Eint_mod (ap c_2Einteger_2Eint_of_num \\
& V0n)) (ap c_2Einteger_2Eint_of_num V1m)) = (ap c_2Einteger_2Eint_of_num \\
& (ap (ap c_2Earithmetic_2EMOD V0n) V1m))))))) \wedge ((\forall V2p \in ty_2Einteger_2Eint. \\
& (\forall V3q \in ty_2Einteger_2Eint. ((\neg(V3q = (ap c_2Einteger_2Eint_of_num \\
& c_2Enum_2E0))) \Rightarrow ((ap (ap c_2Einteger_2Eint_mod V2p) (ap c_2Einteger_2Eint_neg \\
& V3q)) = (ap c_2Einteger_2Eint_neg (ap (ap c_2Einteger_2Eint_mod \\
& (ap c_2Einteger_2Eint_neg V2p)) V3q))))))) \wedge ((\forall V4x \in ty_2Einteger_2Eint. \\
& ((ap c_2Einteger_2Eint_neg (ap c_2Einteger_2Eint_neg V4x)) = \\
& V4x)) \wedge ((\forall V5m \in ty_2Enum_2Enum. (\forall V6n \in ty_2Enum_2Enum. \\
& (((ap c_2Einteger_2Eint_of_num V5m) = (ap c_2Einteger_2Eint_of_num \\
& V6n)) \Leftrightarrow (V5m = V6n))) \wedge ((\forall V7x \in ty_2Einteger_2Eint. ((ap \\
& c_2Einteger_2Eint_neg V7x) = (ap c_2Einteger_2Eint_of_num \\
& c_2Enum_2E0))) \Leftrightarrow (V7x = (ap c_2Einteger_2Eint_of_num c_2Enum_2E0))))))) \\
& \end{aligned} \tag{79}$$

Assume the following.

$$\begin{aligned}
& \forall A_27a. nonempty A_27a \Rightarrow (\forall V0n \in ty_2Enum_2Enum. (\\
& (p (ap (ap c_2Eprim_rec_2E_3C V0n) (ap (c_2Ewords_2EINT_MIN \\
& A_27a) (c_2Ebool_2Ethe_value A_27a)))) \Rightarrow ((ap (c_2Einteger_word_2Ew2i \\
& A_27a) (ap (c_2Ewords_2En2w A_27a) V0n)) = (ap c_2Einteger_2Eint_of_num \\
& V0n)))) \\
& \end{aligned} \tag{80}$$

Assume the following.

$$\begin{aligned}
& \forall A_27a. nonempty A_27a \Rightarrow (\forall V0n \in ty_2Enum_2Enum. (\\
& ((p (ap (ap c_2Earithmetic_2E_3C_3D (ap (c_2Ewords_2EINT_MIN \\
& A_27a) (c_2Ebool_2Ethe_value A_27a))) V0n)) \wedge (p (ap (ap c_2Eprim_rec_2E_3C \\
& V0n) (ap (c_2Ewords_2Edimword A_27a) (c_2Ebool_2Ethe_value \\
& A_27a)))) \Rightarrow ((ap (c_2Einteger_word_2Ew2i A_27a) (ap (c_2Ewords_2En2w \\
& A_27a) V0n)) = (ap c_2Einteger_2Eint_neg (ap c_2Einteger_2Eint_of_num \\
& (ap (ap c_2Earithmetic_2E_2D (ap (c_2Ewords_2Edimword A_27a) \\
& (c_2Ebool_2Ethe_value A_27a))) V0n)))))) \\
& \end{aligned} \tag{81}$$

Assume the following.

$$\begin{aligned}
& ((\forall V0n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2B \\
& c_2Enum_2E0) V0n) = V0n)) \wedge ((\forall V1n \in ty_2Enum_2Enum.((ap \\
& (ap c_2Earithmetic_2E_2B V1n) c_2Enum_2E0) = V1n)) \wedge ((\forall V2n \in \\
& ty_2Enum_2Enum.(\forall V3m \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2B \\
& (ap c_2Earithmetic_2ENUMERAL V2n)) (ap c_2Earithmetic_2ENUMERAL \\
& V3m)) = (ap c_2Earithmetic_2ENUMERAL (ap c_2Enumeral_2EiZ (ap \\
& (ap c_2Earithmetic_2E_2B V2n) V3m))))))) \wedge ((\forall V4n \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2E_2A c_2Enum_2E0) V4n) = c_2Enum_2E0)) \wedge \\
& ((\forall V5n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2A \\
& V5n) c_2Enum_2E0) = c_2Enum_2E0)) \wedge ((\forall V6n \in ty_2Enum_2Enum. \\
& (\forall V7m \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2A \\
& ap c_2Earithmetic_2ENUMERAL V6n)) (ap c_2Earithmetic_2ENUMERAL \\
& V7m)) = (ap c_2Earithmetic_2ENUMERAL (ap (ap c_2Earithmetic_2E_2A \\
& V6n) V7m))))))) \wedge ((\forall V8n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2D \\
& c_2Enum_2E0) V8n) = c_2Enum_2E0)) \wedge ((\forall V9n \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2E_2D V9n) c_2Enum_2E0) = V9n)) \wedge ((\forall V10n \in \\
& ty_2Enum_2Enum.(\forall V11m \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2D \\
& (ap c_2Earithmetic_2ENUMERAL V10n)) (ap c_2Earithmetic_2ENUMERAL \\
& V11m)) = (ap c_2Earithmetic_2ENUMERAL (ap (ap c_2Earithmetic_2E_2D \\
& V10n) V11m))))))) \wedge ((\forall V12n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2EEXP \\
& c_2Enum_2E0) (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\
& V12n))) = c_2Enum_2E0)) \wedge ((\forall V13n \in ty_2Enum_2Enum.((ap \\
& (ap c_2Earithmetic_2EEXP c_2Enum_2E0) (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Earithmetic_2EBIT2 V13n))) = c_2Enum_2E0)) \wedge ((\forall V14n \in \\
& ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2EEXP V14n) c_2Enum_2E0) = \\
& (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))))) \wedge \\
& ((\forall V15n \in ty_2Enum_2Enum.(\forall V16m \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2EEXP (ap c_2Earithmetic_2ENUMERAL V15n)) \\
& (ap c_2Earithmetic_2ENUMERAL V16m)) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap (ap c_2Earithmetic_2EEXP V15n) V16m))))))) \wedge (((ap c_2Enum_2ESUC \\
& c_2Enum_2E0) = (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\
& c_2Earithmetic_2EZERO)))) \wedge ((\forall V17n \in ty_2Enum_2Enum. \\
& (ap c_2Enum_2ESUC (ap c_2Earithmetic_2ENUMERAL V17n)) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Enum_2ESUC V17n)))) \wedge (((ap c_2Eprim_rec_2EPRE c_2Enum_2E0) = \\
& c_2Enum_2E0) \wedge ((\forall V18n \in ty_2Enum_2Enum.((ap c_2Eprim_rec_2EPRE \\
& (ap c_2Earithmetic_2ENUMERAL V18n)) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Eprim_rec_2EPRE V18n))))))) \wedge ((\forall V19n \in ty_2Enum_2Enum. \\
& (((ap c_2Earithmetic_2ENUMERAL V19n) = c_2Enum_2E0) \Leftrightarrow (V19n = c_2Earithmetic_2EZERO))) \wedge \\
& ((\forall V20n \in ty_2Enum_2Enum.((c_2Enum_2E0 = (ap c_2Earithmetic_2ENUMERAL \\
& V20n)) \Leftrightarrow (V20n = c_2Earithmetic_2EZERO))) \wedge ((\forall V21n \in ty_2Enum_2Enum. \\
& (\forall V22m \in ty_2Enum_2Enum.(((ap c_2Earithmetic_2ENUMERAL \\
& V21n) = (ap c_2Earithmetic_2ENUMERAL V22m)) \Leftrightarrow (V21n = V22m)))) \wedge \\
& ((\forall V23n \in ty_2Enum_2Enum.((p (ap (ap c_2Eprim_rec_2E_3C \\
& V23n) c_2Enum_2E0)) \Leftrightarrow False)) \wedge ((\forall V24n \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) (ap c_2Earithmetic_2ENUMERAL \\
& V24n))) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C c_2Earithmetic_2EZERO) \\
& V24n))))))) \wedge ((\forall V25n \in ty_2Enum_2Enum.(\forall V26m \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3C (ap c_2Earithmetic_2ENUMERAL \\
& V25n)) (ap c_2Earithmetic_2ENUMERAL V26m))) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C \\
& V25n) V26m))))))) \wedge ((\forall V27n \in ty_2Enum_2Enum.((p (ap (ap c_2Earithmetic_2E_3E \\
& c_2Enum_2E0) V27n)) \Leftrightarrow False)) \wedge ((\forall V28n \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3E (ap c_2Earithmetic_2ENUMERAL \\
& V28n)) c_2Enum_2E0)) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C c_2Earithmetic_2EZERO) \\
& V28n))))))) \wedge ((\forall V29n \in ty_2Enum_2Enum.(\forall V30m \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3E (ap c_2Earithmetic_2ENUMERAL \\
& V29n)) (ap c_2Earithmetic_2ENUMERAL V30m))) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C \\
& V30m) V29n))))))) \wedge ((\forall V31n \in ty_2Enum_2Enum.((p (ap (ap c_2Earithmetic_2E_3C_3D \\
& c_2Enum_2E0) V31n)) \Leftrightarrow True)) \wedge ((\forall V32n \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3D (ap c_2Earithmetic_2ENUMERAL \\
& V32n)) (ap c_2Earithmetic_2ENUMERAL V32n))) \Leftrightarrow True)))) \wedge \\
& ((\forall V33n \in ty_2Enum_2Enum.((p (ap (ap c_2Eprim_rec_2E_3D c_2Enum_2E0) V33n)) \\
& (ap c_2Earithmetic_2ENUMERAL V33n))) \Leftrightarrow False)))
\end{aligned}$$

Assume the following.

Assume the following.

$$\begin{aligned}
 & (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\
 & ((c_2Earithmetic_2ZERO = (ap c_2Earithmetic_2EBIT1 V0n)) \Leftrightarrow False) \wedge \\
 & (((ap c_2Earithmetic_2EBIT1 V0n) = c_2Earithmetic_2ZERO) \Leftrightarrow \\
 & False) \wedge (((c_2Earithmetic_2ZERO = (ap c_2Earithmetic_2EBIT2 \\
 & V0n)) \Leftrightarrow False) \wedge (((ap c_2Earithmetic_2EBIT2 V0n) = c_2Earithmetic_2ZERO) \Leftrightarrow \\
 & False) \wedge (((ap c_2Earithmetic_2EBIT1 V0n) = (ap c_2Earithmetic_2EBIT2 \\
 & V1m)) \Leftrightarrow False) \wedge (((ap c_2Earithmetic_2EBIT2 V0n) = (ap c_2Earithmetic_2EBIT1 \\
 & V1m)) \Leftrightarrow False) \wedge (((ap c_2Earithmetic_2EBIT1 V0n) = (ap c_2Earithmetic_2EBIT1 \\
 & V1m)) \Leftrightarrow (V0n = V1m)) \wedge (((ap c_2Earithmetic_2EBIT2 V0n) = (ap c_2Earithmetic_2EBIT2 \\
 & V1m)) \Leftrightarrow (V0n = V1m)))))))))) \\
 \end{aligned} \tag{84}$$

Assume the following.

$$\begin{aligned}
 & (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\
 & ((p (ap (ap c_2Eprim_rec_2E_3C c_2Earithmetic_2ZERO) (ap c_2Earithmetic_2EBIT1 \\
 & V0n))) \Leftrightarrow True) \wedge (((p (ap (ap c_2Eprim_rec_2E_3C c_2Earithmetic_2ZERO) \\
 & (ap c_2Earithmetic_2EBIT2 V0n))) \Leftrightarrow True) \wedge (((p (ap (ap c_2Eprim_rec_2E_3C \\
 & V0n) c_2Earithmetic_2ZERO) \Leftrightarrow False) \wedge (((p (ap (ap c_2Eprim_rec_2E_3C \\
 & (ap c_2Earithmetic_2EBIT1 V0n)) (ap c_2Earithmetic_2EBIT1 V1m))) \Leftrightarrow \\
 & (p (ap (ap c_2Eprim_rec_2E_3C V0n) V1m))) \wedge (((p (ap (ap c_2Eprim_rec_2E_3C \\
 & (ap c_2Earithmetic_2EBIT2 V0n)) (ap c_2Earithmetic_2EBIT2 V1m))) \Leftrightarrow \\
 & (p (ap (ap c_2Eprim_rec_2E_3C V0n) V1m))) \wedge (((p (ap (ap c_2Eprim_rec_2E_3C \\
 & (ap c_2Earithmetic_2EBIT1 V0n)) (ap c_2Earithmetic_2EBIT2 V1m))) \Leftrightarrow \\
 & (\neg(p (ap (ap c_2Eprim_rec_2E_3C V1m) V0n))) \wedge ((p (ap (ap c_2Eprim_rec_2E_3C \\
 & (ap c_2Earithmetic_2EBIT2 V0n)) (ap c_2Earithmetic_2EBIT1 V1m))) \Leftrightarrow \\
 & (p (ap (ap c_2Eprim_rec_2E_3C V0n) V1m)))))))))) \\
 \end{aligned} \tag{85}$$

Assume the following.

$$\begin{aligned}
 & (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\
 & ((p (ap (ap c_2Earithmetic_2E_3C_3D c_2Earithmetic_2ZERO) V0n)) \Leftrightarrow \\
 & True) \wedge (((p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Earithmetic_2EBIT1 \\
 & V0n)) c_2Earithmetic_2ZERO) \Leftrightarrow False) \wedge (((p (ap (ap c_2Earithmetic_2E_3C_3D \\
 & (ap c_2Earithmetic_2EBIT2 V0n)) c_2Earithmetic_2ZERO) \Leftrightarrow False) \wedge \\
 & (((p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Earithmetic_2EBIT1 \\
 & V0n)) (ap c_2Earithmetic_2EBIT1 V1m))) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D \\
 & V0n) V1m))) \wedge (((p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Earithmetic_2EBIT1 \\
 & V0n)) (ap c_2Earithmetic_2EBIT2 V1m))) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D \\
 & V0n) V1m))) \wedge (((p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Earithmetic_2EBIT2 \\
 & V0n)) (ap c_2Earithmetic_2EBIT1 V1m))) \Leftrightarrow (\neg(p (ap (ap c_2Earithmetic_2E_3C_3D \\
 & V1m) V0n))) \wedge ((p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Earithmetic_2EBIT2 \\
 & V0n)) (ap c_2Earithmetic_2EBIT2 V1m))) \Leftrightarrow (p (ap (ap c_2Earithmetic_2E_3C_3D \\
 & V0n) V1m)))))))))) \\
 \end{aligned} \tag{86}$$

Assume the following.

$$\begin{aligned}
 & \forall A_{27a}.nonempty\ A_{27a} \Rightarrow ((ap\ (c_2Ewords_2Edimword\ A_{27a}) \\
 & \quad (c_2Ebool_2Ethethe_value\ A_{27a})) = (ap\ (ap\ c_2Earithmetic_2EEEXP \\
 & \quad (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT2\ c_2Earithmetic_2EZERO)))) \\
 & \quad (ap\ (c_2Efcp_2Edimindex\ A_{27a})\ (c_2Ebool_2Ethethe_value\ A_{27a}))) \\
 & \quad (87))
 \end{aligned}$$

Theorem 1

$$\begin{aligned}
 & \forall A_{27a}.nonempty\ A_{27a} \Rightarrow (\forall V0n \in ty_2Enum_2Enum. (\\
 & \quad \forall V1m \in ty_2Enum_2Enum. (((p\ (ap\ (ap\ c_2Eprim_rec_2E_3C \\
 & \quad V0n)\ (ap\ (c_2Ewords_2Edimword\ A_{27a})\ (c_2Ebool_2Ethethe_value \\
 & \quad A_{27a})))) \wedge (p\ (ap\ (ap\ c_2Earithmetic_2E_3C_3D\ V1m)\ (ap\ (c_2Efcp_2Edimindex \\
 & \quad A_{27a})\ (c_2Ebool_2Ethethe_value\ A_{27a})))))) \Rightarrow ((ap\ c_2Einteger_2EEnum \\
 & \quad (ap\ (ap\ c_2Einteger_2Eint_mod\ (ap\ (c_2Einteger_word_2Ew2i \\
 & \quad A_{27a})\ (ap\ (c_2Ewords_2En2w\ A_{27a})\ V0n)))\ (ap\ (ap\ c_2Einteger_2Eint_exp \\
 & \quad (ap\ c_2Einteger_2Eint_of_num\ (ap\ c_2Earithmetic_2ENUMERAL \\
 & \quad (ap\ c_2Earithmetic_2EBIT2\ c_2Earithmetic_2EZERO))))\ V1m))) = \\
 & \quad (ap\ (ap\ c_2Earithmetic_2EMOD\ V0n)\ (ap\ (ap\ c_2Earithmetic_2EEEXP \\
 & \quad (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT2\ c_2Earithmetic_2EZERO))) \\
 & \quad V1m)))))))
 \end{aligned}$$