WISCoding for QUAD

By CWMc   Date 10-6-59   Page 1 of 3

FLOW #	ORDER #	X	TYPE	A	B	C	#	X	T	A	B	C
			SQR 1	[∫a [	[ ] x_i [	[β]			0	001	027	3e8
				[ ]	[ ]	[ ]	/	0	001	027	3e8
0.11		37	E	LO [SQR 1]	[1,12]	[ ]	001	025	1	35f	01c	016
.12		25	E	LO [∫a [	[25,12]	[ ]	2	019	1	35f	19c	00b
.13		13	E	LO [ ] x_i [	[1,12]	[ ]	3	00d	1	35f	01c	021
.14		1	E	LO [β]	[1,12]	[ ]	4	001	1	35f	01c	025
.15		100	A	1 A [ ] + 1 C [ ] → LO [ ]			5	100	8	3fb	3fd	35f
.16		100	A	[ ] + 1 AC [ ]	[ ]		6	100	8	00b	\	00c
.17		100	A	[ ] + 1 AC [ ]	[ ]		7	100	8	\	35f	00d
0.31		100	A	[ ] + 1 AC [ ]	[ ]		8	100	8	021	35f	022
.32		100	A	[ ] + 1 AC [ ]	[ ]		9	100	8	\	35f	023
.33		100	A	[ ] + 1 AC [ ]	[ ]		a	100	8	\	35f	024
				[ ]	[ ]	[ ]						
0.21			A	a ( ) + 0 [ ] → a [ ]			b	/	8	(	)3ff	35d
.22			A	b [ ] + 0 [ ] → b [ ]			c	(				)
.23			A	c [ ] + 0 [ ] → c [ ]			d	(				)
1.01			TZ	a [ ] - 0 [ ]	[ ]		e	/	c	35d	3ff	026 → D
				[ ]	[ ]	[ ]						
2.11			D	b [ ] ÷ a [ ] → [\ ]			f	/	3	35e	35d	\
.12			M	b/a [ ] × ½ [ ] → [\ ]			010	/	2	\	3f8	\
.13			S	0 [ ] - b/2a [ ] → - b/2a [ ]			1	/	a	3ff	\	35a
2.21			M	[\ ] · [\ ] → op/b [ ]			2	/	2	\	\	35b
.22			D	c [ ] ÷ a [ ] → [\ ]			3	/	3	35f	35d	\
.23			S	(b/2a)² [ ] [\ ] → R [ ]			4	/	a	35b	\	35c
				[ ]	[ ]	[ ]						

WISCoding for QUAD

FLOW #	ORDER #	X	TYPE	A	B	C	#	HEXADECIMAL X	T	A	B	C
2.31		100	A	[ ]	[ ]	[ ]	015	100	8	017	3ff	35f
.32			TU	[ ]	[ ]	[ ]	6	/	5	/	/	( )
.33				R[ ]	$\sqrt{R}$[ ]	β[ ]	7	/	0	35c	35b	018
				[ ]	[ ]	[ ]						
3.01			TN	$\sqrt{R}$[ ]	-0[ ]	[ ]	8	/	e	35b	3ff	01c
4.11			A	0[ ]	+0[ ]	→x_{j_1}[ ]	9	/	8	3ff	3ff	35d
.12			A	0[ ]	+0[ ]	→x_{j_2}[ ]	a	/	8	3ff	3ff	35f
.13			TU	[ ]	[ ]	[ ]	b	/	5	/	/	01f
				[ ]	[ ]	[ ]						
4.21			S	0[ ]	-$\sqrt{R}$[ ]	→x_{j_1}[ ]	c	/	2	3ff	35b	35d
4.31			A	0[ ]	+$\sqrt{R}$[ ]	→x_{j_2}[ ]	d	/	8	3ff	35b	35f
4.41			A	0[ ]	+0[ ]	→$\sqrt{R}$[ ]	.e	/	8	3ff	3ff	35b
				[ ]	[ ]	[ ]						
5.11			A	$-b/2a$[ ]	+$\sqrt{R}$[ ]	→x_{r_1}[ ]	f	/	8	352	35b	35c
5.21			S	$-b/2a$[ ]	-$\sqrt{R}$[ ]	→x_{r_2}[ ]	020	/	2	352	35b	35e
				[ ]	[ ]	[ ]						
6.11			A	x_{r_1}[ ]	+0[ ]	→x_{r_1}[ ]	1	/	8	352	3ff	( )
.12			A	x_{j_1}[ ]	+0[ ]	→x_{j_1}[ ]	2	(				)
.13			A	x_{r_2}[ ]	+0[ ]	→x_{r_2}[ ]	3	(				)
.14			A	x_{j_2}[ ]	+0[ ]	→x_{j_2}[ ]	4	(				)
6.21			TU	[ ]	[ ]	[β]	5	/	5	/	/	( )
7.11			H A	0[ ]	+0[ ]	→$\sqrt{R}$[ ]	6 7	/	c 8	3ff	3ff	35b
7.21			D	c[ ]	÷b[ ]	→ [ ]	8	/	3	35f	35e	\
.22			S	0[ ]	-%[ ]	→-%[ ]	9	/	2	3ff	\	352
.23			TU	[ ]	[ ]	[ ]	a	/	5	/	/	01c

Left margin annotations: LINK SQR · IF R≥0 · COMPUTE j TERMS · IF <0 · COMPUTE REAL TERMS · OUTPUT · ODe · IF ≥0 · →SQR
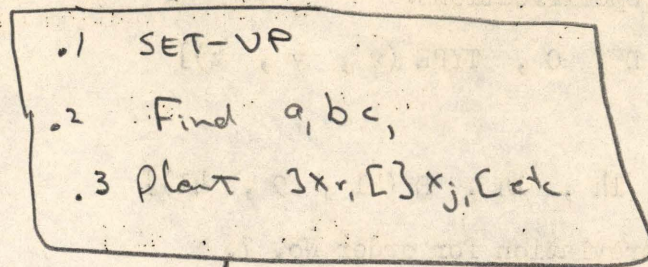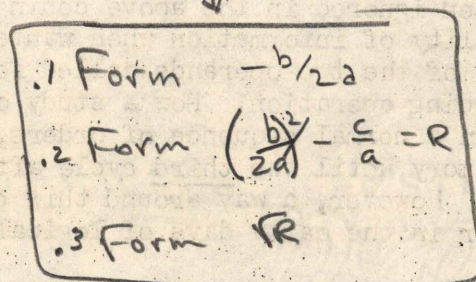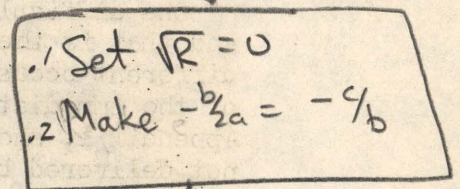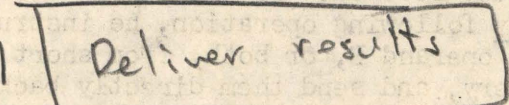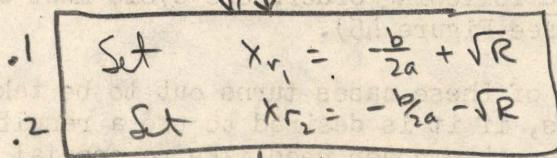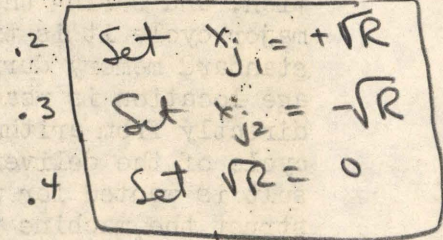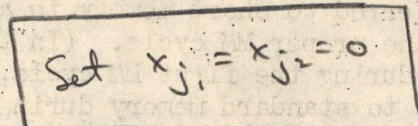
QUAD

α

.1 SET-UP
.2 Find a, b, c,
.3 Plant $\exists x_r$, $[\,] x_{j_i}$, C etc.

Is a = 0 ? — Yes → HALT

No ↓

.1 Form $-b/2a$
.2 Form $\left(\frac{b}{2a}\right)^2 - \frac{c}{a} = R$
.3 Form $\sqrt{R}$

7
.1 Set $\sqrt{R} = 0$
.2 Make $-\frac{b}{2a} = -\frac{c}{b}$

Is $\sqrt{R} < 0$? — Yes ↓

No ↓

.1 Set $x_{j_1} = x_{j_2} = 0$
.2 Set $x_{j_1} = +\sqrt{R}$
.3 Set $x_{j_2} = -\sqrt{R}$
.4 Set $\sqrt{R} = 0$

.1 Set $x_{r_1} = -\frac{b}{2a} + \sqrt{R}$
.2 Set $x_{r_2} = -\frac{b}{2a} - \sqrt{R}$

.1 Deliver results

.2

β

QUAD

35a $-b/2a$; $(-c/b)$

b   OPSTO ; $\sqrt{(\tfrac{b}{2a})^2 - \tfrac{c}{a}}$;

c $(\tfrac{b}{2a}) - \tfrac{c}{a}$; Xr_1 ;

d a ;   SQR ; Xj ;

e b ;   SQR ; Xr_2 ;

f   LO ; 1^{AC} ;   C ;   SQR ; Xj_2 ;

6   OPSTOs $35a \longrightarrow 35f$ (shared w/ SQR)

Uses SQR (adapted)
Must give SQR:1 in calling link

$$j = k = ~~~~~~~ 028$$

exact ;   depends only on accuracy
$$X = -\tfrac{b}{2a} \pm \sqrt{(\tfrac{b}{2a})^2 - \tfrac{a}{c}}$$ of   SQR

floating point arithmetic
a,b,c normalized hexadecimal in consecutive locations

$Xr_1 , Xj_1 , Xr_2 , Xj_2$ given in normalized hex in con locations

If   a = 0
$$X_1 = X_2 = -\tfrac{c}{b} + j0$$

000000102a3e8,
025135f01c016,
019135f19c00b,
00d135f01c021,
001135f01c025,
10083fb3fd35f,
100800b80000c,
100880035f00d,
100802135f022,
100880035f023,
100880035f024,
00080003ff35d,
000000000000,
000000000000,
000c35d3ff026,
000335e35d800,
00028003f8800,
000a3ff80035a,
000280080035b,
000335f35d800,
000a35b80035c,
10080173ff35f,
0005000000000,
000035c35b018,
000e35b3ff01c,
00083ff3ff35d,
00083ff3ff35f,
000500000001f,
000a3ff35b35d,
00083ff3ff35b,
000a3ff35d35f,
000835a35b35c,
000a35a35b35e,
000835c3ff000,
000000000000,
000000000000,
000000000000,
0005000000000,
000600000027,
00083ff3ff35b,
000335f35e800,
000a3ff80035a,
000500000001c,