

52046 Program Description I

Program Title SQUARE ROOT TO 182 FIGURES

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Program Description, Equations, Variables _____

$$\sqrt{N} = \sqrt{x_i^2 + r_i} = x_i + \frac{r_i}{2x_i} = x_{2i}$$

there $N = \text{radikand}$

$x_i = \text{approx. root to } i \text{ fig}$

$r_i = \text{the rest belonging to } x_i$

$x_{2i} = \text{the new root with } 2i \text{ fig.}$

Operating Limits and Warnings _____

N is a positiv max. 8-fig number > 1

THE TWO LAST FIGURES ARE PROBABLY WRONG

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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5 2 0 4 6

[illegible]

Sample Problem(s) $\sqrt{10}$ with 182 fig

 $\sqrt{10}$ with 182 fig

solution CARD ONE $K=23$ A
 $N=10$ R/S

After 18-19 min prgrm will stop

CARD TWO A and
after 10-11 min more prgram will stop

Solution(s) _____ For result press B or R/S

For result press B or R/S

3162 2776 6016 8379 3319 9889 3544 4327 1853 3719
5551 3932 5216 8268 5750 4852 7925 9443 8639 2382
2134 4248 1083 7930 0295 1873 4728 4152 8400 5514
8548 8560 3045 3880 0146 9051 9596 7001 5390 3344
9216 5717 9259 9406 5915 0116

The two last 16 are probably wrong.

Reference(s) SQUARE ROOT TO 100 FIG WITH REST
HP LIBRARY AUTHOR R. BROECKX
#51576 WILRIJK, BELGIUM

SQUARE ROOT TO 100 FIG WITH REST

HP LIBRARY AUTHOR R. BROECKX

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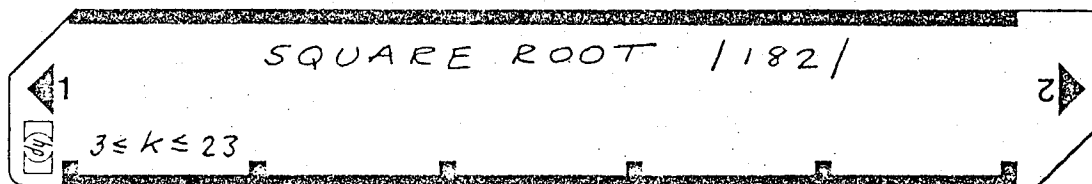
WILRIJK BELGIUM



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User Instructions

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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
	<u>CARD ONE</u>			
1	Load side 1 and 2			DSP 0
2	Deside number of fig = 8k there $3 \leq k \leq 23$	k	A	k
3	Put in N	N	R/S	0
4	To see root with 4k fig		R/S	"XXXX ₁ " "XXXX ₂ " : : "XXXX _k " 0
5	To see rest		n SF 0 R/S	"rrrr ₁ " "rrrr ₂ " : "rrrr _k " 0
	The steps 4 and 5 are repeatable			
	<u>CARD TWO</u>			
1	Load side 1 and 2			DSP 0
2	start program		A	0
3	To see root with 8k fig •		B OV R/S	"XXXX ₁ " "XXXX ₂ " : : "XXXX _k " 0
	step 3 can be repeted			



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Program Listing I

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	* f LBL A	31 25 11			f INT	31 83	
	f CL REG	31 43			1	01	
	f PDS	31 42			+	61	
	f CL REG	31 43		060	STO D	33 14	
	STO E	33 15			* f LBL 2	31 25 02	
	R/S	84			0	00	
	STO O	33 00			h STI	35 33	
	f $\sqrt{x}$	31 54			RCL D	34 14	
	f LOG	31 53			1	01	
010	f INT	31 83			-	51	
	3	03			STO D	33 14	
	-	51			RCL O	34 00	
	CHS	42			f INT	31 83	
	g 10^x	32 53		070	EEX	43	
	g x^2	32 54			4	04	
	STO x O	33 71 00			x	71	
	RCL O	34 00			f DSZ	31 33	
	f $\sqrt{x}$	31 54			h SPACE	35 84	
	f INT	31 83			↓ g GSB a	32 22 11	
020	g x^2	32 54			f $x < 0$	31 71	
	STO - O	33 51 00			↓ GTO 2	22 02	
	RCL O	34 00			EEX	43	
	h LSTX	35 82			4	04	
	EEX	43		080	x	71	
	4	04			h F? 1	35 71 01	
	÷	81			↓ GTO 5	22 05	
	+	61			↓ g GSB a	32 22 11	
	STO O	33 00			↓ g GSB e	32 22 15	
	f INT	31 83			f DSZ	31 33	
030	f $x = 0$	31 51			* f LBL 3	31 25 03	
	↓ GTO 6	22 06			↓ g GSB b	32 22 12	
	h SF 1	35 51 01			RCL E	34 15	
	* f LBL 1	31 25 01			g FRAC	32 83	
	RCL E	34 15		090	EEX	43	
	EEX	43			2	02	
	2	02			x	71	
	CHS	42			h RCI	35 34	
	+	61			-	51	
	STO E	33 15			1	01	
040	f INT	31 83			-	51	
	RCL E	34 15			f $x = 0$	31 51	
	g FRAC	32 83			↓ GTO 4	22 04	
	EEX	43			h R↓	35 53	
	2	02		100	↓ g GSB a	32 22 11	
	x	71			f DSZ	31 33	
	g $x = y$	32 51			↓ g GSB d	32 22 14	
	↓ GTO 6	22 06			↓ GTO 3	22 03	
	1	01			* f LBL 4	31 25 04	
	RCL O	34 00			h R↓	35 53	
050	f INT	31 83			↓ g GSB c	32 22 13	
	+	61			↓ GTO 0	22 00	
	2	02			* f LBL 5	31 25 05	
	÷	81			RCL D	34 14	
	RCL O	34 00		110	g x^2	32 54	
	g FRAC	32 83			-	51	
	÷	81			f $x < 0$	31 71	

REGISTERS

0	1	2	3	4	5	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C	D	E	I				



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Program Listing II

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
↓	GTO 2	22 02			g FRAC	32 83	
	h CF 1	35 61 01		170	h LST X	35 82	
*	f LBL 0	31 25 00			f INT	31 83	
↓	g GSB b	32 22 12			RCL (i)	34 24	
	RCL D	34 14			g FRAC	32 83	
	+	61			+	61	
	EEX	43			STO (i)	33 24	
120	4	04			h X ² y	35 52	
	÷	81			f ISZ	31 34	
	STO (i)	33 24			EEX	43	
↓	GTO 1	22 01			8	08	
*	f LBL 6	31 25 06		180	x	71	
	0	00			h RTN	35 22	
	h ST I	35 33		*	g LBL C	32 25 13	
	R/S	84			RCL D	34 14	
*	f LBL 7	31 25 07			g x ²	32 54	
	RCL (i)	34 24			-	51	
130	h F? 0	35 71 00		*	g LBL d	32 25 14	
↓	GTO 0	22 00			f X>0	31 81	
	g FRAC	32 83			h RTN	35 22	
	EEX	43			EEX	43	
	4	04		190	8	08	
	x	71			+	61	
*	f LBL 0	31 25 00	31 25 00		f DSZ	31 33	
	f INT	31 83			h SPACE	35 84	
	f -x-	31 84			g DSZ(i)	32 33	
	f ISZ	31 34			f ISZ	31 34	
140	RCL E	34 15		↓	GTO f d	22 31 14	
	f INT	31 83		*	g LBL E	32 25 15	
	h RCI	35 34			f X>0	31 81	
	g X=y	32 51			h RTN	35 22	
↓	GTO 6	22 06		200	f DSZ	31 33	
↓	GTO 7	22 07			h SPACE	35 84	
*	g LBL a	32 25 11			RCL (i)	34 24	
	f ISZ	31 34			g FRAC	32 83	
	h SPACE	35 84			EEX	43	
	f ISZ	31 34			4	04	
150	RCL (i)	34 24			x	71	
	f INT	31 83			f ISZ	31 34	
	+	61			RCL (i)	34 24	
	f DSZ	31 33			g FRAC	32 83	
	h SPACE	35 84		210	+	61	
	RCL (i)	34 24			2	02	
	g FRAC	32 83			EEX	43	
	2	02			4	04	
	EEX	43			x	71	
	4	04			+	61	
160	x	71			RCL D	34 14	
	RCL D	34 14			1	01	
	x	71			-	51	
	-	51			STO D	33 14	
	h RTN	35 22		220	h R+	35 53	
*	g LBL b	32 25 12		↓	GTO f c	22 31 15	
	EEX	43					
	4	04					
	÷	81					

LABELS					FLAGS	SET STATUS		
A	B	C	D	E	0	FLAGS	TRIG	DISP
a	b	c	d	e	1	ON OFF		
0	1	2	3	4	2	0 ☐ ☐	DEG ☐	FIX ☒
5	6	7	8	9	3	1 ☐ ☐	GRAD ☐	SCI ☐
						2 ☐ ☐	RAD ☐	ENG ☐
						3 ☐ ☐		n <u>0</u>



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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	* f LBL A	31 25 11			g FRAC	32 83	
	h CF 3	35 61 03			+	61	
	CLX	44			STO E	33 15	
	STO D	33 14		060	h STI	35 33	
	* f LBL 1	31 25 01			RCL 0	34 00	
	1	01	fetch the		g FRAC	32 83	
	CHS	42	first ten		RCL D	34 14	
	RCL (i)	34 24	figures of		f INT	31 83	
	f INT	31 83	the rest		x	71	
010	EEX	43	(the latent)		ENTER	41	
	4	04			f INT	31 83	
	x	71			STO-(i)	33 51 24	
	f ISZ	31 34			-	51	
	RCL (i)	34 24		070	RCL (i)	34 24	
	f INT	31 83			f INT	31 83	
	f X < 0	31 71			STO-(i)	33 51 24	
	+	61			-	51	
	+	61			EEX	43	
	f ISZ	31 34			4	04	
020	RCL (i)	34 24			x	71	
	EEX	43			f ISZ	31 34	
	4	04			STO-(i)	33 51 24	
	÷	81			CLX	44	
	+	61		080	h X 2 I	35 24	
	RCL 0	34 00	bring the		STO E	33 15	
	g FRAC	32 83	first ten		f ISZ	31 34	
	EEX	43	figures of		* f LBL 2	31 25 02	
	4	04	the root to		1	01	
	x	71	x-reg. (disp)		RCL (i)	34 24	
	RCL 1	34 01			g FRAC	32 83	
	g FRAC	32 83			f X < 0	31 71	
	+	61			+	61	
	RCL 2	34 02			RCL D	34 14	
	g FRAC	32 83		090	f INT	31 83	
	EEX	43			x	71	
	4	04			ENTER	41	
	÷	81			f INT	31 83	
	+	61			f ISZ	31 34	
	÷	81			RCL E	34 15	
040	h RCI	35 34	check if last		h X 2 I	35 24	
	RCL E	34 15	rest has been		STO E	33 15	
	g FRAC	32 83	computed		h R ↓	35 53	
	EEX	43	when - go to		STO-(i)	33 51 24	
	2	02	LBL 6	100	h F ? 3	35 71 03	
	x	71	"round off"		h RTN	35 22	
	g X = y	32 51			-	51	
	↓ GTO 6	22 06			EEX	43	
	h R ↑	35 54			4	04	
	f INT	31 83	store a new		x	71	
050	RCL D	34 14	4-fig part of		f ISZ	31 34	
	+	61	the root		STO-(i)	33 51 24	
	STO D	33 14			RCL E	34 15	
	h RCI	35 34			h X 2 I	35 24	
	2	02	Adm. rout.	110	STO E	33 15	
	-	51	for storage		ENTER	41	
	RCL E	34 15	control		g FRAC	32 83	

Decrease
preceding
rest with
the actual
4-digit part
times the
square root
computed
by card 1

store
control
root.

check up that
computation will
stop after reg
before reg.

ALL REGISTERS USED

0	1	2	3	4	5	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C	D	E	I				

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	EEX	43				03	
	2	02	filled by	170	3	03	"statistically
	X	71	rest.root		÷	81	mean error-
	1	01			-	51	neous in the
	-	51			ENTER	41	two last fig."
	g X > y	32 81			f INT	31 83	
	↓ GTO 2	22 02			RCL (i)	34 24	NOT PROVED
120	h SF 3	35 51 03	the last reg		g FRAC	32 83	
	↓ f GSB 2	31 22 02	is computed		+	61	
	RCL E	34 15	abbreviated		STO (i)	33 24	
	h X & I	35 24			f ISZ	31 34	
	STO E	33 15		180	1	01	
	EEX	43	Take 4 fig		RCL (i)	34 24	
	4	04	from D add		g FRAC	32 83	
	RCL D	34 14	104 if last		f X < 0	31 71	
	ENTER	41	fig in prec.		+	61	
	g FRAC	32 83	4 fig-pmt was		h RA	35 54	
130	EEX	43	ended by an		g FRAC	32 83	
	2	02	odd digit.		EEX	43	
	X	71			4	04	
	h ST I	35 33	Divide by 2		X	71	
	h R &	35 53	and store	190	f INT	31 83	
	f INT	31 83	definitely		+	61	
	h F? 2	35 71 02			STO (i)	33 24	
	+	61			RCL E	34 15	
	2	02			2	02	
	÷	81			+	61	
140	ENTER	41			STO E	33 15	
	g FRAC	32 83			* f LBL 3	31 25 03	Display
	f X ≠ 0	31 61			h CF 0	35 61 00	rount.
	h SF 2	35 51 02			CLX	44	
	-	51		200	h ST I	35 33	
	STO + (i)	33 61 24			R/S	84	
	f ISZ	31 34	store		* f LBL B	31 25 12	
	h RCI	35 34	control		RCL (i)	34 24	
	RCL E	34 15	rount		h F? 0	35 71 00	
	g FRAC	32 83			↓ GTO 5	22 05	
150	+	61			g FRAC	32 83	
	STO E	33 15			EEX	43	
	h RCI	35 34			4	04	
	EEX	43			X	71	
	2	02		210	* f LBL 5	31 25 05	
	÷	81			f INT	31 83	
	STO D	33 14			h PAUSE	35 72	← change if too
	↓ GTO 1	22 01			f ISZ	31 34	short display
	* f LBL 6	31 25 06	compute and		RCL E	34 15	time
	f DSZ	31 33	round off the		f INT	31 83	
160	f DSZ	31 33	last eight fig.		h RCI	35 34	
	EEX	43			g X ≠ y	32 61	
	4	04			↓ GTO B	22 12	
	h RA	35 54			h F? 0	35 71 00	
	h F? 2	35 71 02		220	↓ GTO 3	22 03	
	+	61			h SF 0	35 51 00	
	2	02			CLX	44	
	÷	81			h ST I	35 33	
	RCL D	34 14			↓ GTO B	22 12	

LABELS					FLAGS	SET STATUS		
	B	C	D	E		FLAGS	TRIG	DISP
a	b	c	d	e	1	ON OFF	DEG ☐	FIX ☐
0	1	2	3	4	2	1 ☐	GRAD ☐	SCI ☐
5	6	7	8	9	3	2 ☐	RAD ☐	ENG ☐
						3 ☐		n _____