Sinclair Cambridge Programmable

Works out mortgage repayment
Solves quadratic equations
Calculates impar regression
Helps design a twin-T filter
Plays a lunar landing game!

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USERS LIBRARY

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To solve hundreds of problems in finance, mathematics, statistics, physics, engineering and electronics, we've written 294 programs specially for the Sinclair Cambridge Programmable. There are 12 samples in this booklet — the rest are all in the Sinclair Program Library.

Before you try any of the programs, familiarise yourself with the calculator by working, calculator in hand, through the Instruction Booklet enclosed. You'll then be able to use the programs quickly and easily.

Remember these are only sample programs reproduced half size—
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Whatever your speciality, the program library will make the Sinclair Cambridge Programmable the specialist calculator for you!

the state of the s

Day of the week of Christmas Day (program on facing page)

Press	Display
AV 2 0 0 go to	0.0000110
learn RUN	

Now press the sequence of keys in the program as shown in the first column on the facing page.

Press	Display
X	0.000001
ChN/#	0.000002
1	0.00000
-/EE/-	0.000004
•	*
à	•
·	•
4	P
	0.000034
stop 0	0.0000 35
	.0000 00

The last step has brought you back to step 00 which shows the check symbol for X (the first step) i.e. . on the left of the display.

As you are already at step 00 there is no need to press

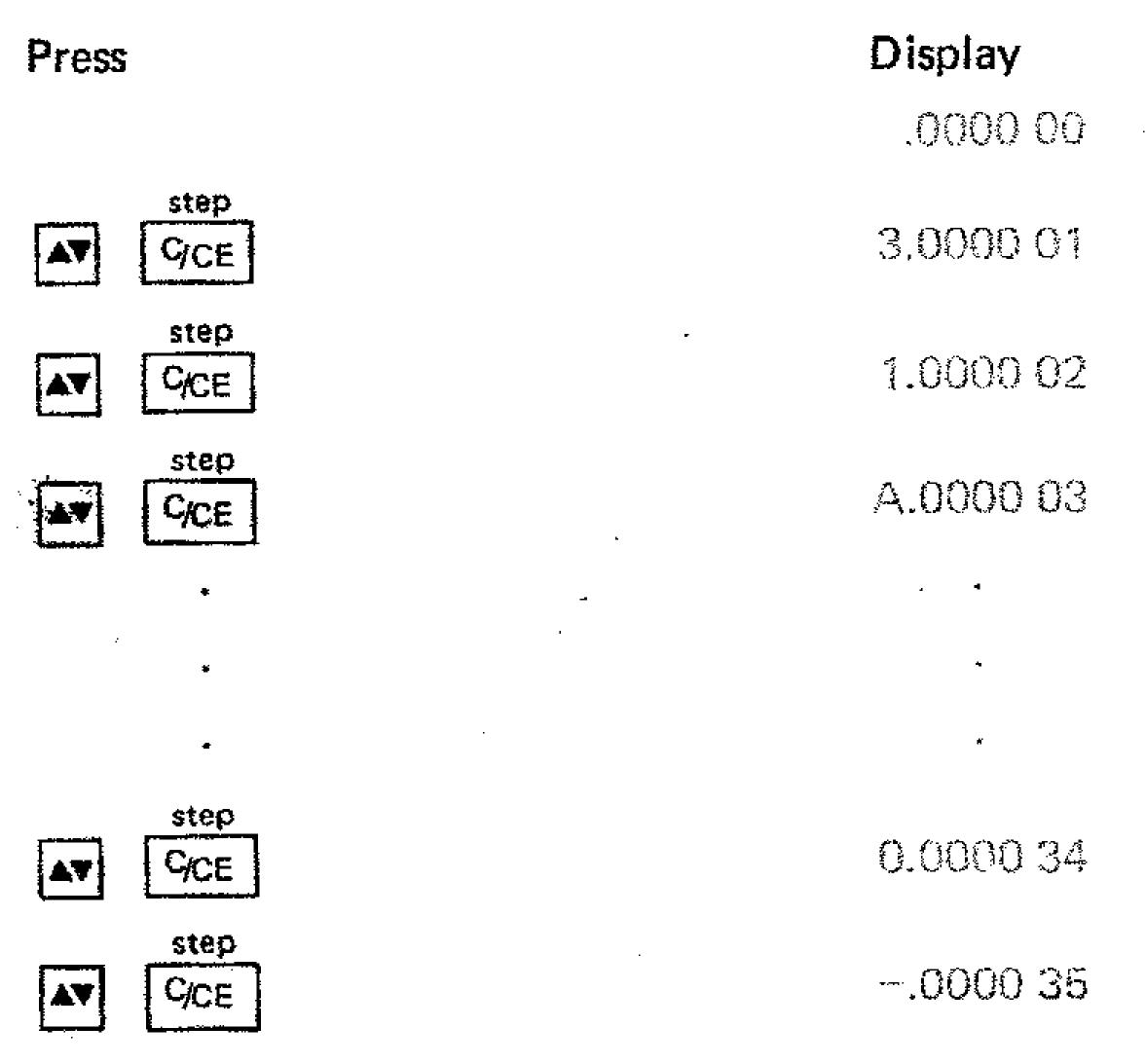


but you need to do this if you finish at any other step number.

Execution:
year (in full) / RUN / day as a number where 1 = Sunday 2 = Monday, etc

Χ	: •	00
#	3	01
1	1	02
•	Α	03
2	2	04
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6	6	07
	F	08
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3	3	12
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2	4	28 29 30 31
2	4 6 - 0	28 29 30 31 32 33
2 4)	4	28 29 30 31 32 33

Checking the program



At each step, the check symbol on the left of the display should correspond with the check symbols shown in the second column on the program.

If you entered the program correctly, press



then CE and you are ready to execute the program.

If you made an error at any stage in the program, read the section on correcting the program on page 19 of the instruction booklet.

Executing the program

Example

Press	Display
1 9 7 7	1977
RUN	

i.e. Christmas Day in 1977 falls on a Sunday.

Given:

Amount of original mortgage
Monthly repayment
Number of years since mortgage was originally
taken out
Rate of interest

Finds:

Balance

Execution:

rate / RUN / number of years / RUN / monthly repayment / RUN / original amount / RUN / balance

Example:

I bought a house seven years ago and took out a mortgage for £5500 at 11%% interest. My monthly repayment has been £70. I now want to sell my house and pay off the mortgage. How much will I have to pay?

Rate Number of years

7 RUN 7 0 RUN

5 RUN

Original amount
Balance = £3438

Monthly payment

5 5 0 0 RUN

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**************************************		26
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stop	0	30
)	6	31
	E	32
	5	33
rcl	<u> </u>	

Partner to term end tour

Execution:

metres/RUN/fuet/RUN/inches

Note: This program may take some time to execute.

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1	1	32
2	2	33
——————————————————————————————————————	**************************************	34
stop	0	35

Given any α with $0 < \alpha < 0.5$, finds x to within about 2 sig. fig. so that the probability that a standard normal random variable exceeds x is α .

Execution:

 α / RUN / \times

For greater accuracy (-1% error) divide result by 1-006.

For still greater accuracy use execution sequence $\dot{\alpha}/X/1.0007/RUN/\div/1.006/=/x$

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stop	0	31
₩	Α	32
	~	33
goto	2	33
0	0	34
O	n.	35

All the hyperbolic functions

Execution:

x/RUN/sinhx/RUN/cosechx/RUN/ coshx/RUN/sechx/RUN/tanhx/RUN/ cothx/

Range:

 $1.0017 \times 10^{-4} \le |x| \le 7.8566$

e ^x	4	01
-	E	02
#	3	03
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(F	07
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	E	14
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sto	2	16
tan	9	17
stop	0	18
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stop	0	21
rcl	5	22
COS	8	23
guranos a contrata un un un contrata un co	G	24
=		25
stop	0	26
*	G	27
=		28
stop	0	29
rcl	5	30
sin	7	31
stop	0	32
*	G	33
		34
stop	0	35
		<u> </u>

 $ax^{2} + bx + c = 0$ Roots x_{1} , x_{2} if real R ± il if complex

Execution:

a/RUN/b/ RUN/c/RUN/ RUN / C/CE / G/CE / if roots

are real

// C/CE / RUN / R/

if roots are complex

* error symbol displayed

After the sequence a / RUN / b / RUN / c / RUN / the display shows either (if the roots are real) the larger real root with no error indication or (if the roots are complex) the imaginary part and the error symbol. Continue with the appropriate execution sequence.

The error symbol will tell you whether the roots are complex. The sequence $/ RUN / RUN / CE / shown above after <math>(x_2)$ is necessary before entering a new equation to be solved.

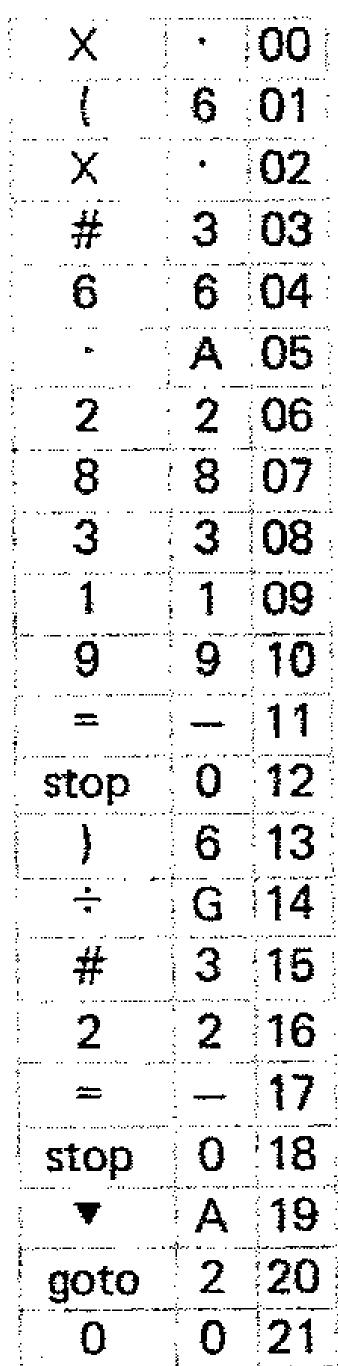
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	6	13
rcl	5	14
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	6	16
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	Α	18
gin	1	19
3	3	20
2	2	21
\sqrt{x}	1	22
*	Α	23
MEx	5	24
	F	25
stop	0	26
rcl	5	27
	F	28
rcl	5	29
	Marie Sandra de	30
eton	0	31
stop \sqrt{x}	1	32
V		
stop	0	33
rcl	5	34
stop	0	35

Sample from Volume 2

Sample from Volume 3

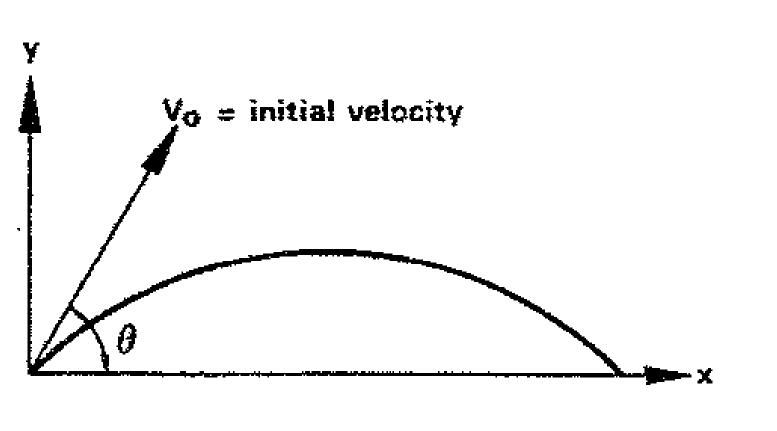
Execution:

radius / RUN / piralina in accorde / RUN / asset



francisco de la comunicación de la

Position reisties to print of projection sétur



$$x = v_0 t \cos \theta$$

$$x = v_o t \cos \theta$$

$$y = v_o t \sin \theta - \frac{gt^2}{2}$$

Execution:

In S.I. units; g taken as 9.81ms⁻².

₩	Α	00
D→R	3	01
sto	2	02
tan	9	03
X		04
(6	05
<u>*</u> ***********************************	5	06
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stop	0	11
sto	2	12
	6	13
stop	0	14
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Fizgordi contration, that distion and mass change.

$$T' = T \left(1 - \frac{v^2}{c^2} \right)^{\frac{1}{2}}$$

$$L' = L \left(1 - \frac{v^2}{c^2} \right)^{\frac{1}{2}}$$

$$M' = M \left(1 - \frac{v^2}{c^2} \right)^{-\frac{1}{2}}$$

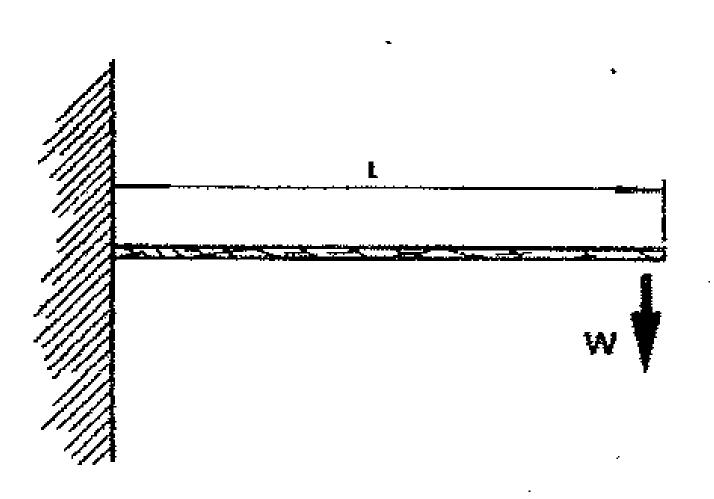
Execution:

- (i) v/RUN/c/RUN/T/X/RUN/T
- (ii) v/RUN/c/RUN/L/X/RUN/L'
- (iii) v/RUN/c/RUN/M/÷/RUN/M'

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stop	0	13
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The state of the s

Beam with one fixed end and load Wat free end



end slope =
$$\frac{W\ell^2}{2EI}$$

end deflection =
$$\frac{W^{3}}{3EI}$$

Execution:

R/RUN/W/RUN/E/RUN/I/RUN/
slope/RUN/deflection

sto	2	00
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Χ	#	02
stop	0	03
TE	G	04
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stop	0	07
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#	3	09
2	2	10
	G	11
stop	0	12
#	3	13
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•	A	15
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rcl	5	18
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Pre-execution:

0 / AV / sto / GCE / AV / AV / goto / 0 / 0 /

Execution:

 $R_1/RUN/R_2/RUN/\frac{R_1R_2}{R_1+R_2}/R_3/\cdots/R_n/$ RUN / Reposited

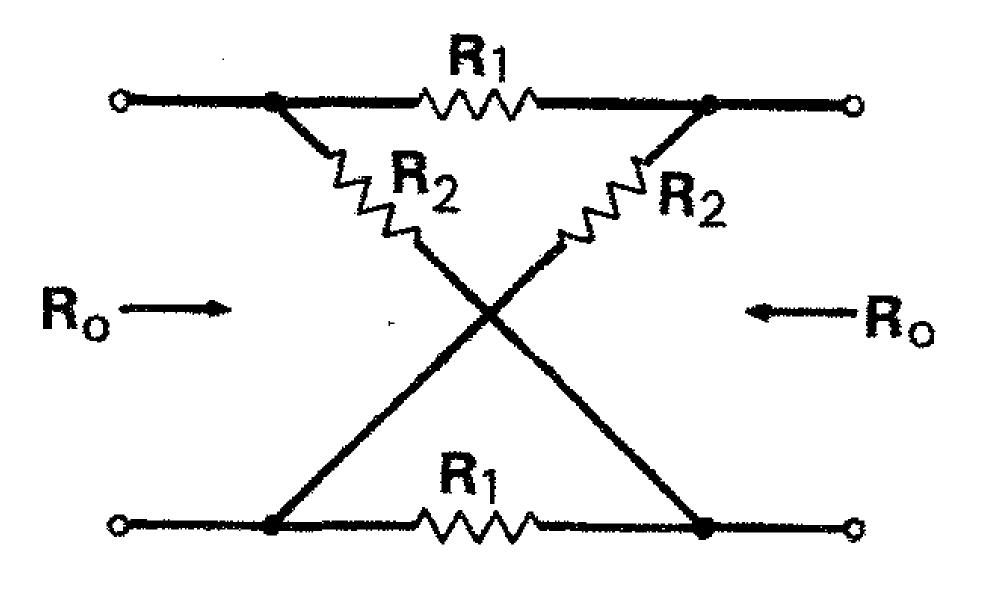
Alternative execution:

To find resistor R₂ required to make parallel combination of R_1 and $R_2 = R$:

R/RUN/R1/AV/AV/7-/RUN/R3

(R₁ must be greater than R)

.	E	U1
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sto	2	04
	G	05
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stop	0	07
₩	Α	08
goto	2	09
0	0	10
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(must be balanced, constant impedance)

$$a_v = a_i = a$$

$$A = -20 \log a$$

Characteristic impedance = R_o

$$R_1 = \frac{1-a}{1+a} R_0$$

$$R_1 = \frac{1-a}{1+a}R_0$$
 $R_2 = \frac{1+a}{1-a}R_0$

Execution:

either

/ AT / goto / 1 / 3 / a / RUN / Ro / RUN / $R_2/RUN/R_4$

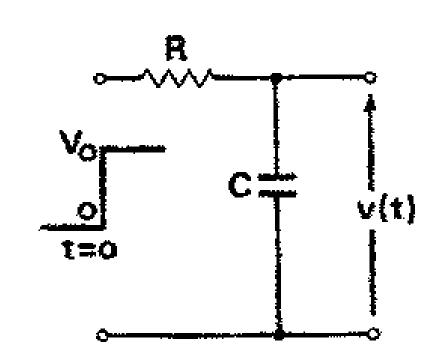
or

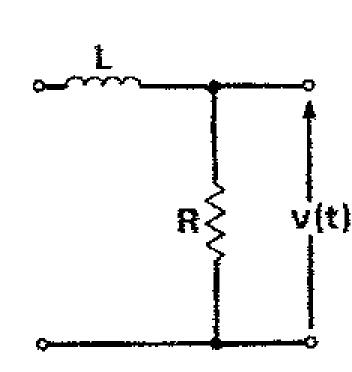
/A/RUN/R_o/RUN/R₂/RUN/R₃

<u> </u>	F	00
	G	01
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	A	04
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stop	U	34
		35

Sample from Volume 4

Simple L - Rorti -- Remail





$$\tau = CR$$
 or $\tau = \frac{L}{R}$

Charge: $V_c(t) = V_o(1 - e^{-\frac{t}{r}})$

Discharge: $V_d(t) = V_o e^{\frac{t}{\tau}}$

Pre-execution:

$$R/X/C/=/AV/sto/$$
 or $L/\div/R/=/AV/sto/$ or $\tau/AV/sto/AV/goto/0/0/$

Execution:

t/RUN/Vo/RUN/Va(t)

-	G	00
rcl	5	01
	F	02
		03
*	Α	04
e [×]	4	05
Х	*	06
stop	0	07
		80
stop	0	09
V	Α	10
goto	2	11
0	0	12
0	0	13
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All four volumes of the Sinclair Program Library contain programs designed specifically for use with the Sinclair Cambridge Programmable.

Each volume adopts the same, easy-to-follow layout as this sample, using the same keyboard vocabulary.

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Barclaycard* account no	, the sum of £
Name	
Address	

Signature

*Delete as applicable.