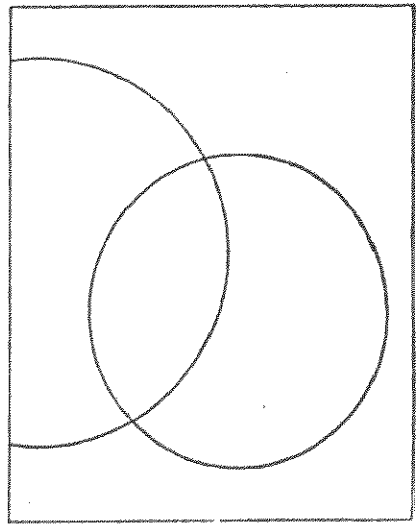
PROGRAM LIBRARY



〈Prior to use〉

- Always check the number of remaining steps before attempting to store programs.
- The library is divided into two parts: a calculation section and a graph section. The calculation section shows only answers, while the graph section shows whole displays.
- To make programs in the graph section easier to follow, ↵ is used to indicate carriage returns. The [EXE] key should be pressed wherever ↵ appears (↵ does not appear on the display).
- Press the Graph key whenever "Graph" appears within a program (Graph Y = indicated).
- If it is necessary to specify a calculation mode (e.g. Base-n, SD1) in a program, be sure to specify it after pressing [MODE] [2] (WRT mode).

  Then start programming by pressing [EXE].

CASIO PROGRAM SHEET

Program for: Prime factor analysis | No. 1

Description

Prime factors of arbitrary positive integers are produced

For $1 < m < 10^{10}$

prime numbers are produced from the lowest value first. "END" is displayed at the end of the program.

(Overview)

m is divided by 2 and by all successive odd numbers ($d = 3, 5, 7, 9, 11, 13, \ldots$) to check for divisibility.

Where d is a prime factor, $m_1 = m_1 \div d$ is assumed, and division is repeated until $\sqrt{m_1} + 1 < d$.

Example

(1)

$119 = 7 \times 17$

(2)

$1234567890 = 2 \times 3 \times 3 \times 5 \times 3607 \times 3803$

(3)

$987654321 = 3 \times 3 \times 17 \times 17 \times 379721$

Preparation and operation

- Store the program written on the next page
- Execute the program as shown below in the RUN mode ([MODE] [1])

Step	Key operation	Display	Step	Key operation	Display
1	[Prog] 0 [EXE]	M ?	11	[EXE]	3803.
2	119 [EXE]	7.	12	[EXE]	END
3	[EXE]	17.	13	[EXE]	M ?
4	[EXE]	END	14	987654321 [EXE]	3.
5	[EXE]	M ?	15	[EXE]	3.
6	1234567890 [EXE]	2.	16	[EXE]	17.
7	[EXE]	3.	17	[EXE]	17.
8	[EXE]	3.	18	[EXE] (After 12 seconds)	379721.
9	[EXE]	5.	19	[EXE]	END
10	[EXE] (After 74 seconds)	3607.	20		

No. 1

Line	[MODE] [2] Program																Notes	Number of steps
1	Mcl	:																1
2	Lbl	0	:	"	M	"	?	→	A	:	Goto	2	:					13
3	Lbl	1	:	2	◢	A	÷	2	→	A	:	A	=	1	⇒			31
4	Goto	9	:															3
5	Lbl	2	:	Frac	(	A	÷	2	)	=	0	⇒	Goto	1	:			41
6	3	→	B	:														5
7	Lbl	3	:	√	A	+	1	→	C	:								61
8	Lbl	4	:	B	≥	C	⇒	Goto	8	:	Frac	(	A	÷	B			71
9	)	=	0	⇒	Goto	6	:											81
10	Lbl	5	:	B	+	2	→	B	:	Goto	4	:						96
11	Lbl	6	:	A	÷	B	×	B	−	A	=	0	⇒	Goto	7			111
12	:	Goto	5	:														117
13	Lbl	7	:	B	◢	A	÷	B	→	A	:	Goto	3	:				123
14	Lbl	8	:	A	◢													13
15	Lbl	9	:	"	E	N	D	"	◢	Goto	0							145
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		

Memory contents

A	m_1	H		O		V	
B	d	I		P		W	
C	$\sqrt{m_1} + 1$	J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T			
G		N		U			

Program for: **Greatest common measure** No. 2

Description

Euclidean general division is used to determine the greatest common measure for two integers a and b.

For $|a|, |b| < 10^{8}$, positive values are taken as $< 10^{10}$

〈Overview〉

$n_0 = \max(|a|, |b|)$

$n_1 = \min(|a|, |b|)$

$n_k = n_{k-2} - \left(\frac{n_{k-2}}{n_{k-1}}\right) n_{k-1}$

$k = 2, 3 \ldots\ldots$

If $n_k = 0$, then the greatest common measure (c) will be n_{k-1}.

Example

	〈1〉	〈2〉	〈3〉
When	$a = 238$	$a = 23345$	$a = 522952$
	$b = 374$	$b = 9135$	$b = 3208137866$
	↓	↓	↓
	$c = 34$	$c = 1015$	$c = 998$

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode (MODE 1).

Step	Key operation	Display	Step	Key operation	Display
1	Prog 0 EXE	A ?	11		
2	238 EXE	B ?	12		
3	374 EXE	34.	13		
4	EXE	A ?	14		
5	23345 EXE	B ?	15		
6	9135 EXE	1015.	16		
7	EXE	A ?	17		
8	522952 EXE	B ?	18		
9	3208137866 EXE	998.	19		
10			20		

Line	Program	Notes	Number of steps
1	Lbl 1 : " A " ? → A : " B " ? →		15
2	B :		17
3	Abs A → A : Abs B → B :		27
4	B < A ⇒ Goto 2 :		34
5	A → C : B → A : C → B :		46
6	Lbl 2 : (−) (Int (A ÷ B) × B − A		61
7	) → C :		65
8	C = 0 ⇒ Goto 3 :		72
9	B → A : C → B : Goto 2 :		83
10	Lbl 3 : B ◢ Goto 1		90
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

Memory contents

A	a, n_0	H		O		V	
B	b, n_1	I		P		W	
C	n_k	J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T			
G		N		U			

CASIO PROGRAM SHEET

Program for	No.
Definite integrals using Simpson's rule	3

Description

$$I = \int_a^b f(x)dx = \frac{h}{3}\{y_0 + 4(y_1 + y_3 + \ldots + y_{2m-1}) + 2(y_2 + y_4 + \ldots + y_{2m-2}) + y_{2m}\}$$

$$h = \frac{b-a}{2m}$$

The right-hand portion of the above equation can be transformed as follows

$$I = \frac{h}{3}\{y_0 + \sum_{i=1}^{m}(4y_{2i-1} + 2y_{2i}) - y_{2m}\}$$

Let $f(x) = \frac{1}{x^2+1}$

Example

(1) $a = 0, b = 1, 2m = 10$

$$I = \int_0^1 \frac{1}{x^2+1}dx = 0.7853981537$$

(2) $a = 2, b = 5, 2m = 20$

$$I = \int_2^5 \frac{1}{x^2+1}dx = 0.2662526769$$

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode ([MODE] [1]).

Step	Key operation	Display	Step	Key operation	Display
1	[Prog] 0 [EXE]	A ?	11		
2	0 [EXE]	B ?	12		
3	1 [EXE]	2 M ?	13		
4	10 [EXE]	0.7853981535	14		
5	[EXE]	A ?	15		
6	2 [EXE]	B ?	16		
7	5 [EXE]	2 M ?	17		
8	20 [EXE]	0.2662526769	18		
9			19		
10			20		

No. 3

Line	[MODE] [2] Program	Notes	Number of steps
1	P0		
2	Lbl 1 : Fct :		5
3	" A " ? → A : " B " ? → B : "		20
4	2 M " ? → M :		27
5	A → G : Prog 1 : P → I : (B − A		42
6	) ÷ M → D : M ÷ 2 → O :		54
7	Lbl 2 : G ÷ D → G : Prog I : I + P		69
8	× 4 → I :		74
9	G + D → G : Prog 1 : I + P × 2 →		89
10	I : O − 1 → O :		97
11	O ≠ 0 ⇒ Goto 2 :		104
12	B → G : Prog 1 : I − P → I :		117
13	D × I ÷ 3 ◢		123
14	Goto 1		125
15			
16	P1		
17	I + (G × G + I) → P		11
18			
19		Total 136 steps	
20			
21			
22			
23			
24			
25			
26			
27			
28			

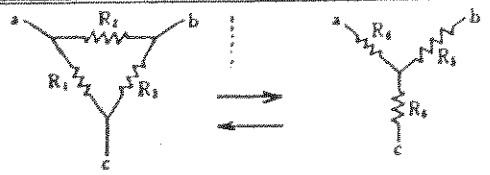
Memory contents

A	a	H		O	m (Number of repetitions)	V	
B	b	I	I	P		W	
C		J		Q		X	
D	$h = \frac{b-a}{2m}$	K		R		Y	
E		L		S		Z	
F		M	$2m$	T			
G	x	N		U			

CASIO PROGRAM SHEET

Program for	No.
△ ⟷ Y transformation	4

Description



1) △→Y

$$R_4=\frac{R_1\cdot R_2}{R_1+R_2+R_3}$$

$$R_5=\frac{R_2\cdot R_3}{R_1+R_2+R_3}$$

$$R_6=\frac{R_3\cdot R_1}{R_1+R_2+R_3}$$

2) Y→△

$$R_1=\frac{R_4R_5+R_5R_6+R_6R_4}{R_5}$$

$$R_2=\frac{R_4R_5+R_5R_6+R_6R_4}{R_6}$$

$$R_3=\frac{R_4R_5+R_5R_6+R_6R_4}{R_4}$$

Example

(1)
$R_1=12(\Omega)$
$R_2=47(\Omega)$
$R_3=82(\Omega)$

(2)
$R_4=100(\Omega)$
$R_5=150(\Omega)$
$R_6=220(\Omega)$

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode (MODE 1).

Step	Key operation	Display	Step	Key operation	Display
1	Prog 0 EXE	D→Y:1,Y→D:2?	11	EXE	D→Y:1,Y→D:2?
2	1 EXE	R 1= ?	12	2 EXE	R 4= ?
3	12 EXE	R 2= ?	13	100 EXE	R 5= ?
4	47 EXE	R 3= ?	14	150 EXE	R 6= ?
5	82 EXE	R 4=	15	220 EXE	R 1=
6	EXE	4.	16	EXE	466.6666667
7	EXE	R 5=	17	EXE	R 2=
8	EXE	27.33333333	18	EXE	318.1818182
9	EXE	R 6=	19	EXE	R 3=
10	EXE	6.978723404	20	EXE	700.

No. 4

Line	MODE 2 Program																Notes	Number of steps
1	Lbl	1	:	"	D	→	Y	:	I	,	Y	→	D	:	2			15
2	"	?	→	N	:													20
3	N	=	2	⇒	Goto	2	:	N	*	I	⇒	Goto	1	:				34
4	"	R	1	=	"	?	→	A	:									43
5	"	R	2	=	"	?	→	B	:									52
6	"	R	3	=	"	?	→	C	:									61
7	A	+	B	+	C	→	D	:										69
8	"	R	4	=	"	◢	A	×	B	+	D	◢						81
9	"	R	5	=	"	◢	B	×	C	+	D	◢						93
10	"	R	6	=	"	◢	A	×	C	+	D	◢						105
11	Goto	1	:															108
12	Lbl	2	:															111
13	"	R	4	=	"	?	→	E	:									120
14	"	R	5	=	"	?	→	F	:									129
15	"	R	6	=	"	?	→	G	:									138
16	E	×	F	+	F	×	G	+	G	×	E	→	H	:				152
17	"	R	1	=	"	◢	H	÷	F	◢								162
18	"	R	2	=	"	◢	H	÷	G	◢								172
19	"	R	3	=	"	◢	H	÷	E	◢								182
20	Goto	1																184
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		

Memory contents

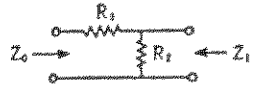
A	R_1	H	$R_4R_5+R_5R_6+R_6R_4$	O		V	
B	R_2	I		P		W	
C	R_3	J		Q		X	
D	$R_1+R_2+R_3$	K		R		Y	
E	R_4	L		S		Z	
F	R_5	M		T			
G	R_6	N	For judgement	U			

CASIO PROGRAM SHEET

Program for	No.
Minimum loss matching	5

Description

Calculate R_1 and R_2 which match Z_0 and Z_1 with loss minimized. ($Z_0 > Z_1$)



$$R_1 = Z_0\sqrt{1-\frac{Z_1}{Z_0}} \qquad R_2 = \frac{Z_1}{\sqrt{1-\frac{Z_1}{Z_0}}}$$

$$\text{Minimum loss } L_{min} = 20\log\left(\sqrt{\frac{Z_0}{Z_1}} + \sqrt{\frac{Z_0}{Z_1}-1}\right)\text{[dB]}$$

Example

Calculate the values of R_1, R_2 and L_{min} for $Z_0 = 500\,\Omega$ and $Z_1 = 200\,\Omega$.

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode (MODE 1).

Step	Key operation	Display	Step	Key operation	Display
1	Prog 0 EXE	Z 0= ?	11		
2	500 EXE	Z 1= ?	12		
3	200 EXE	R 1=	13		
4	EXE	387.2983346	14		
5	EXE	R 2=	15		
6	EXE	258.1988897	16		
7	EXE	LMIN =	17		
8	EXE	8.961393328	18		
9			19		
10			20		

No. 5

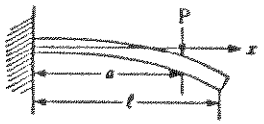
Line	MODE 2 Program	Notes	Number of steps
1	" Z 0 = " ? → Y :		9
2	" Z 1 = " ? → Z :		18
3	√(1 − Z ÷ Y) → A :		29
4	Y × A → R : Z ÷ A → S : Y ÷ Z		44
5	→ B : 2 0 × log (√ B + √ (B −		59
6	1)) → T :		65
7	" R 1 = " ◢ R ◢		73
8	" R 2 = " ◢ S ◢		81
9	" L M I N = " : T		90
10–28			

Memory contents

A	$\sqrt{1-\frac{Z_1}{Z_0}}$	H		O		V	
B	$\frac{Z_0}{Z_1}$	I		P		W	
C		J		Q		X	
D		K		R	R 1	Y	Z_0
E		L		S	R 2	Z	Z_1
F		M		T	Lmin		
G		N		U			

Program for: **Cantilever under concentrated load** | No. 6

Description



E : Young's modulus (kg/mm²)
I : Geometrical moment of inertia (mm⁴)
a : Distance of concentrated load from support (mm)
P : Load (kg)
x : Distance of point of interest from the support (mm)

Deflection y (mm), Angle of deflection s (°), Bending moment M (kg · mm)

① $\ell > x > a$

$$y = \frac{Pa^3}{6EI} - \frac{Pa^2}{2EI}x$$

$$s = \tan^{-1}\left(-\frac{Pa^2}{2EI}\right)$$

M = 0 (shearing load $W_S = 0$)

② $x \leq a$

$$y = \frac{P}{6EI}x^3 - \frac{Pa}{2EI}x^2$$

$$s = \tan^{-1}\left\{\frac{Px}{2EI}(x - 2a)\right\}$$

$M = P(x - a)$ (shearing load $W_S = P$)

Example

E = 4000 kg/mm²
I = 5 mm⁴
a = 30 mm
P = 2 kg

What are deflection, angle of deflection, bending moment and shearing load at $x = 25$ mm and $x = 32$ mm?

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode (MODE 1).

Step	Key operation	Display	Step	Key operation	Display
1	Prog 0 EXE	E = ?	11	EXE	−10.
2	4000 EXE	I = ?	12	EXE	X = ?
3	5 EXE	A = ?	13	32 EXE	Y =
4	30 EXE	P = ?	14	EXE	−0.99
5	2 EXE	X = ?	15	EXE	S =
6	25 EXE	Y =	16	EXE	−2.57657183
7	EXE	−0.6770833333	17	EXE	M =
8	EXE	S =	18	EXE	0.
9	EXE	−2.505092867	19	Repeat from step 5	
10	EXE	M =	20		

No. 6

Line	Program	Notes	Number of steps
1	Deg : " E = " ? → E : " I = " ?		15
2	→ I : " A = " ? → A : " P = "		30
3	? → P :		34
4	Lbl 1 : " X = " ? → X :		45
5	X ≤ A ⇒ Goto 2 :		52
6	" Y = " ◢ P × A x² ÷ (2 × E ×		67
7	I) × (A ÷ 3 − X) ◢		78
8	" S = " ◢ tan⁻¹ ((−) P × A x² ÷ (2		93
9	× E × I)) ◢ " M = " ◢ 0 ◢		107
10	Goto 1 :		110
11	Lbl 2 :		113
12	" Y = " ◢ P × X x² ÷ (2 × E ×		129
13	I) × (X ÷ 3 − A) ◢		139
14	" S = " ◢ tan⁻¹ (P × X ÷ (2 × E		154
15	× I) × (X − 2 × A)) ◢		167
16	" M = " ◢ P × (X − A) ◢		180
17	Goto 1		182
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

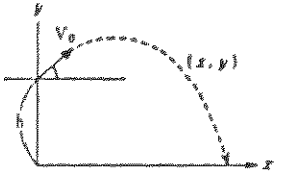
Memory contents

A	a	H		O		V	
B		I	I	P	P	W	
C		J		Q		X	x
D		K		R		Y	
E	E	L		S		Z	
F		M		T			
G		N		U			

CASIO PROGRAM SHEET

Program for	No.
Parabolic movement	7

Description



$x = (V_0 \cos a) \cdot t$

$y = (V_0 \sin a) \cdot t - \frac{1}{2} g t^2 + h$

$g = 9.8\ (m/s^2)$

V_0 (m/s)

a (°)

Δt (sec.)

h (m)

Example

Initial velocity $V_0 = 130$ (m/sec.)

Initial angle $a = 25$ (°)

Height $h = 0$ (m)

$\Delta t = 0.5$ (sec.)

Plot the trace of movement in intervals of Δt.

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode (MODE 1).

Step	Key operation	Display	Step	Key operation	Display
1	Prog 0 EXE	V0= ?	11	EXE	T=
2	130 EXE	A= ?	12	EXE	0.5
3	25 EXE	H= ?	13	EXE	X=
4	0 EXE	T= ?	14	EXE	58.91000616
5	0.5 EXE	T=	15	EXE	Y=
6	EXE	0.	16	EXE	26.24518701
7	EXE	X=	17	Repeat from step 11	
8	EXE	0.	18		
9	EXE	Y=	19		
10	EXE	0.	20		

No. 7

Line	MODE 2 Program																Notes	Num. of steps
1	Deg	:	0	→	S	:												6
2	"	V	0	=	"	?	→	V	:	'	A	=	"	?	→			21
3	A	:	"	'	=	"	?	→	H	:	"	T	=	"	?			36
4	→	T	:															39
5	Lbl	1	:	V	×	cos	A	×	S	→	X	:	V	×	sin			54
6	A	×	S	−	9	.	8	×	S	x^2	÷	2	+	H	→			69
7	Y	:																78
8	"	T	=	"	◢	S	◢	S	+	T	→	S	:					94
9	"	X	=	"	◢	X	◢	"	Y	=	"	◢	Y	◢				98
10	Y	≥	0	⇒	Goto	1												0
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		

Memory contents

A	a	H	h	O		V	V_0
B		I		P		W	
C		J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T	Δt		
G		N		U			

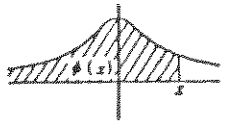
Program for	No.
Normal distribution	8

Description

Obtain normal distribution function $\phi(x)$ (by Hastings' best approximation).

$$\phi(x) = \int_{-\infty}^{x} \phi t \, dx$$

$$\phi t = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$$



Put $t = \frac{1}{1+Px}$

$$\phi(x) \fallingdotseq 1 - \phi t \, (c_1 t + c_2 t^2 + c_3 t^3 + c_4 t^4 + c_5 t^5)$$

$P = 0.2316419$

$C_1 = 0.31938153$

$C_2 = -0.356563782$

$C_3 = 1.78147937$

$C_4 = -1.821255978$

$C_5 = 1.330274429$

Example

Calculate the values of $\phi(x)$ at $x = 1.18$ and $x = 0.7$.

Preparation and operation

- Store the program written on the next page.
- Execute the program as shown below in the RUN mode (MODE 1).

Step	Key operation	Display	Step	Key operation	Display
1	Prog 0 EXE	X = ?	11		
2	1.18 EXE	PX =	12		
3	EXE	0.880999696	13		
4	Prog 0 EXE	X = ?	14		
5	0.7 EXE	PX =	15		
6	EXE	0.7580361367	16		
7			17		
8			18		
9			19		
10			20		

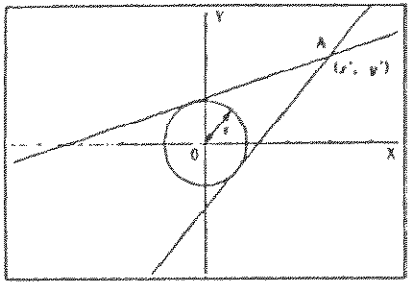
Line	(MODE 2) Program															Notes	Number of steps
1	"	X	=	"	?	→	X	:									8
2	1	÷	(	1	+	0	.	2	3	1	6	4	1	9	×		23
3	X	)	→	T	:	1	÷	√	(	2	×	π	)	×	e^x		38
4	(	(−)	X	x^2	÷	2	)	→	Q	:							48
5	"	P	X	=	"	◢	1	−	Q	×	(	0	.	3	1		63
6	9	3	8	1	5	3	×	T	+	(−)	0	.	3	5	6		78
7	5	6	3	7	8	2	×	T	x^2	+	1	.	7	8	1		93
8	4	7	9	3	7	×	T	x^2	3	+	(−)	1	.	8	2		108
9	1	2	5	5	9	7	8	×	T	x^2	4	+	1	.	3		123
10	3	0	2	7	4	4	2	9	×	T	x^2	5	)				136
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	

Memory contents									
A		H		O		V			
B		I		P		W			
C		J		Q	ϕt	X	x		
D		K		R		Y			
E		L		S		Z			
F		M		T	t				
G		N		U					

CASIO PROGRAM SHEET

Program for	No.
Circle and points of tangency	9

Description



Circle formula

$x^2+y^2=r^2$

Formula for tangent lines passing through point A (x', y')

$y-y'=m(x-x')$

* m is the tangent line slope

Draw a line from point A (x', y') to a circle with radius r, and determine the slope m and intercept b $(=y'-mx')$. Also, read the coordinates of the tangent using the trace function, and use the factor function to magnify the graph.

Example

$r=1$
$x'=3$
$y'=2$

} m and b are determined using these values.

(NOTE)

* $r=x'$ generates an Ma ERROR.

Preparation and operation

* Store the program written on the next page.

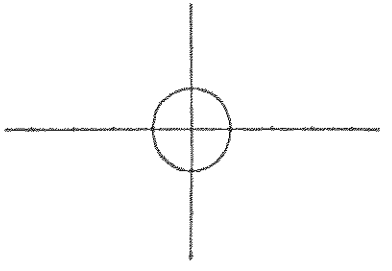
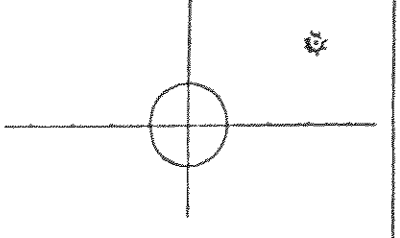
Memory contents

A		H		O		V	
B		I		P		W	
C		J		Q		X	
D		K		R		Y	
E		L		S		←	
F		M		T			
G		N		U			

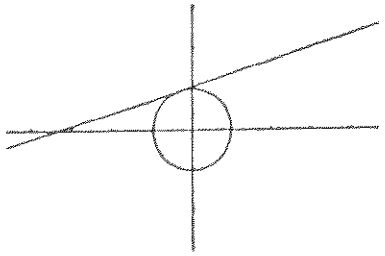
No. 9

Line	MODE 2 Program	Notes	Number of steps
1	PØ ↵		
2	Prog 1 ↵		4
3	" X x^2 + Y x^2 = R x^2 ↵		13
4	R = " ? → R ↵		20
5	Prog 2 ◢		23
6	" (X , Y) ↵		30
7	X = " ? → A ↵		37
8	" Y = " → B ↵		45
9	Plot A , B ◢		50
10	R x^2 (A x^2 + B x^2 − R x^2) → P ↵		65
11	(√ P − A B) (R x^2 − A x^2) x^{-1}		80
12	→ M ↵		83
13	Lbl 6 ↵		86
14	Graph M (X − A) + B ◢		96
15	" M = " ◢ M ◢		103
16	" B = " ◢ B − M A ◢		113
17	Lbl Ø ↵		116
18	" T R A C E ? ↵		124
19	Y E S ⇒ 1 ↵		130
20	N O ⇒ Ø " : ? → Z ↵		140
21	1 → S : Z = 1 ⇒ Goto 1 ↵		151
22	Z = Ø ⇒ Goto 2 : Goto Ø ↵		161
23	Lbl 2 ↵		164
24	((−) A B − √ P) (R x^2 − A x^2)		179
25	x^{-1} → N ↵		183
26	Graph N (X − A) + B ◢		193
27	" M = " ◢ N ◢		200
28	" B = " ◢ B − N A ◢		210
29	Lbl 5 ↵		213
30	" T R A C E ? ↵		221
31	Y E S ⇒ 1 ↵		227
32	N O ⇒ Ø " : ? → Z ↵		237
33	2 → S : Z = 1 ⇒ Goto 1 ↵		248
34	Z = Ø ⇒ [illegible] Goto 5 ↵		258
35	Lbl 1 ↵		261
36	" T R A C E " ◢		269

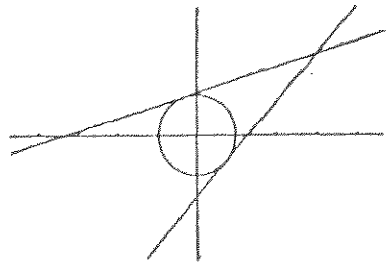
Line	[MODE] [2] Program	Notes	Number of steps
1	" Factor N : N = " ? → F : Factor F ↵		283
2	Prog 2 : S = 1 ⇒ Goto 9 ↵		293
3	S = 2 ⇒ Graph M (X − A) ÷ B ↵		307
4	Graph N (X − A) + B ◢		317
5	Goto 3 ↵		320
6	Lbl 9 ↵		323
7	Graph M (X − A) + B ◢		333
8	Prog 1 : Prog 2 : Goto 6 ↵		342
9	Lbl 3 ↵		345
10	" E N D "		350
11			
12	PI		
13	Range (−) 4 . 7 , 4 . 7 , 1 . (−) 3 .		15
14	1 , 3 . 1 , 1		22
15			
16	P2		
17	Graph √ (R x^{1} − X x^{2}) ↵		10
18	Graph (−) √ (R x^{2} − X x^{2})		20
19			
20		Total 392 steps	
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			

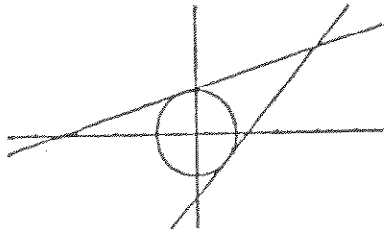
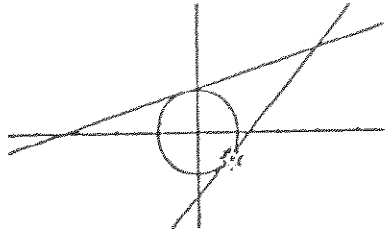
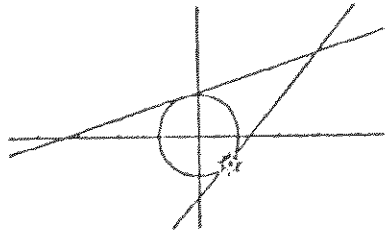
Step	Key operation	Display
1	[Prog] 0 [EXE]	Prog 0 $X^2+Y^2=R^2$ R=?
2	1 [EXE]	
3	[EXE]	Prog 0 $X^2+Y^2=R^2$ R=? 1 done (X, Y) X=?
4	3 [EXE] 2 [EXE]	 X=3.

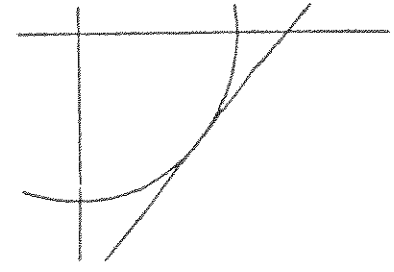
Program for: Circle and points of tangency	No. 9

Step	Key operation	Display
5	[EXE]	
6	[EXE] [EXE]	3 Y=? 2 done done M= 0.3169872981 – Disp –
7	[EXE] [EXE]	2 done done M= 0.3169872981 B= 1.049038106 – Disp –
8	[EXE]	M= 0.3169872981 B= 1.049038106 TRACE? YES⇒1 NO⇒0 ?

Program for: Circle and points of tangency	No. 9

Step	Key operation	Display
9	0 [EXE]	
10	[EXE] [EXE]	YES⇒1 NO⇒0 ? 0 done M= 1.183012702 – Disp –
11	[EXE] [EXE]	? 0 done M= 1.183012702 B= –1.549038106 – Disp –
12	[EXE]	M= 1.183012702 B= –1.549038106 TRACE? YES⇒1 NO⇒0 ?

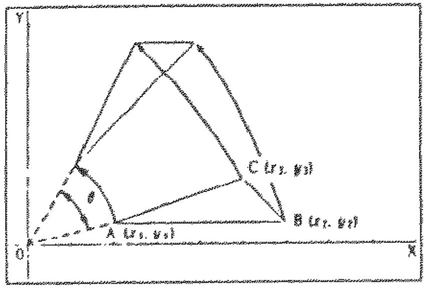
Step	Key operation	Display
13	1 [EXE]	−1.549038106 TRACE? YES⇒1 NO⇒0 ? 1 TRACE − Disp −
14	[SHIFT] [Graph] (Trace)	 X=−1.3
15	[⇨] ~	 X=0.8
16	[SHIFT] [⇩] (X↔Y)	 Y=−0.6026279442

Step	Key operation	Display
17	[EXE]	−1.549038106 TRACE? YES⇒1 NO⇒0 ? 1 TRACE Factor N:N=?
18	4 [EXE]	
19	[EXE]	NO⇒0 ? 1 TRACE Factor N:N=? 4 done END
20		

CASIO PROGRAM SHEET

Program for	Rotation of figures	No. 10

Description



Coordinate conversion formula

$(x, y) \rightarrow (x', y')$

$x' = x\cos\theta - y\sin\theta$

$y' = x\sin\theta + y\cos\theta$

Draw a figure that represents a degree rotation of a triangle.

Example

Draw the figure of the triangle (A (2, 0.5), B (6, 0.5), C (5, 1.5)) rotated 45°

(NOTE)

- The blinking point can be moved using the cursor keys.
- To terminate the program, press the [AC] key during graph display.
- A triangle cannot be drawn if the converted coordinates (E' (set the value of x to 5)) exceed the preset range values.

Preparation and operation

● Store the program written on the next page.

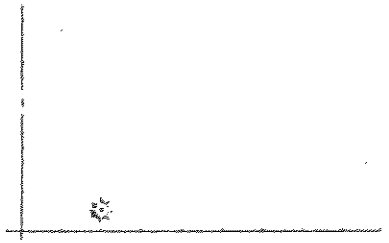
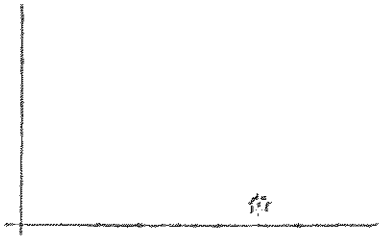
Memory contents							
A	x_1	H	y'_1	O		V	
B	y_1	I	x'_2	P		W	
C	x_2	J	y'_2	Q	θ	X	
D	y_2	K	x'_3	R		Y	
E	x_3	L	y'_3	S		Z	
F	y_3	M		T			
G	x'_1	N		U			

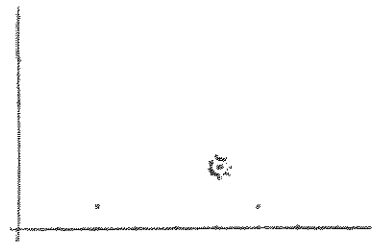
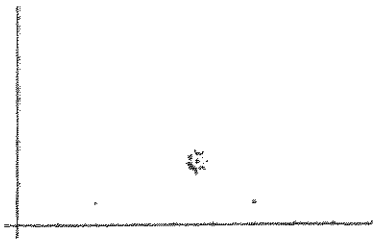
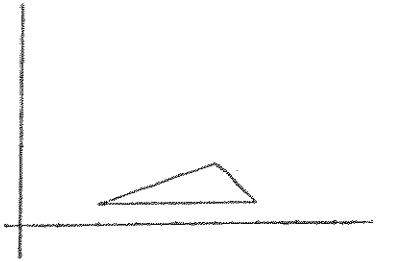
No. 10

Line	MODE 2 Program															Notes	Number of step
1	Range	(−)	0	.	4	,	9	,	1	.	(−)	0	.	8	,		15
2	5	.	4	,	1	:	Deg	↵									23
3	"	(	X	1	,	Y	1	)	↵								32
4	X	1	=	"	?	→	A	↵									40
5	"	Y	1	=	"	?	→	B	↵								49
6	Plot	A	,	B	◢												54
7	X	→	A	:	Y	→	B	↵									62
8	"	(	X	2	,	Y	2	)	↵								71
9	X	2	=	"	?	→	C	↵									79
10	"	Y	2	=	"	?	→	D	↵								88
11	Plot	C	,	D	◢												93
12	X	→	C	:	Y	→	B	↵									101
13	"	(	X	3	,	Y	3	)	↵								110
14	X	3	=	"	?	→	E	↵									118
15	"	Y	3	=	"	?	→	F	↵								127
16	Plot	E	,	F	◢												132
17	X	→	E	:	Y	→	F	↵									140
18	Lbl	1	↵														14[illegible]
19	Line	:	Plot	A	,	B	:	Line	:	Plot	C	,	D	:	Line		158
20	◢																159
21	"	A	N	G	L	E	:	Deg	"	?	→	O	↵				172
22	A	cos	O	−	B	sin	O	→	G	↵							182
23	A	sin	O	+	B	cos	O	→	H	↵							192
24	Plot	G	,	H	↵												197
25	C	cos	O	−	D	sin	O	→	I	↵							207
26	C	sin	O	+	D	cos	O	→	J	↵							217
27	Plot	I	,	J	:	Line	↵										224
28	E	cos	O	−	F	sin	O	→	K	↵							234
29	E	sin	O	+	F	cos	O	→	L	↵							24[illegible]
30	Plot	K	,	L	:	Line	↵										251
31	Plot	G	,	H	:	Line	◢										25[illegible]
32	Cls	:	Plot	C	,	D	:	Plot	E	,	F	:	Goto	1			272
33																	
34																Total 272 step	
35																	
36																	

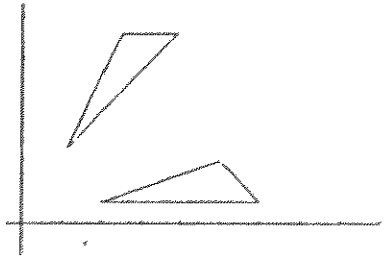
Rotation of figures

No. 10

Step	Key operation	Display
1	Prog 0 EXE	Prog 0 (X1, Y1) X1=?
2	2 EXE 0.5 EXE	 X=2.
3	EXE	(X1, Y1) X1=? 2 Y1=? 0.5 done (X2, Y2) X2=?
4	6 EXE 0.5 EXE	 X=6.

Step	Key operation	Display
5	EXE	(X2, Y2) X2=? 6 Y2=? 0.5 done (X3, Y3) X3=?
6	4.5 EXE 1.5 EXE	 X=4.5
7	⇨ ~ (Set the value of x to 5.)	 X=5.
8	EXE	

Program for: Rotation of figures	No. 10

Step	Key operation	Display
9	[EXE]	(X3, Y3) X3=? 4.5 Y3=? 1.5 done done ANGLE:Deg?
10	45[EXE]	
11	Repeat above procedure from step 8.	
12		

Program for: Rotation of figures	No. 10

Step	Key operation	Display
13		
14		
15		
16		

Program for

Graph variation by parameters

No. 11

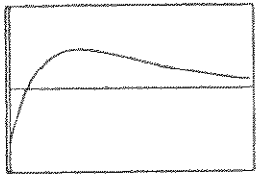
Description

Damped vibration

(i) $\varepsilon > n$ (Overdamping)

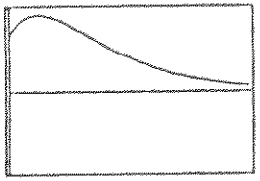
$$P_1 = -\varepsilon + \sqrt{\varepsilon^2 - n^2} \quad , \quad P_2 = -\varepsilon - \sqrt{\varepsilon^2 - n^2}$$

$$x = \frac{v_0 - x_0 P_2}{P_1 - P_2} e^{P_1 t} - \frac{v_0 - x_0 P_1}{P_1 - P_2} e^{P_2 t}$$



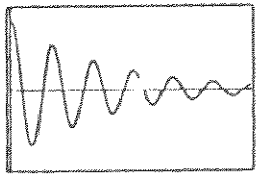
(ii) $\varepsilon = n$ (Critical damping)

$$x = \{x_0 + (v_0 + \varepsilon x_0)t\} e^{-\varepsilon t}$$



(iii) $\varepsilon < n$ (Damping vibration)

$$x = e^{-\varepsilon t} \left\{ x_0 \cos\sqrt{n^2 - \varepsilon^2}\, t + \frac{v_0 + \varepsilon x_0}{\sqrt{n^2 - \varepsilon^2}} \sin\sqrt{n^2 - \varepsilon^2}\, t \right\}$$



Example

Draw a graph of the damping vibration that possesses the following parameters:

(1)	(2)	(3)
$\varepsilon = 0.1$	$\varepsilon = 0.2$	$\varepsilon = 0.2$
$n = 1.5$	$n = 0.2$	$n = 0.18$
$x_0 = 2.5$	$x_0 = 2$	$x_0 = -2$
$v_0 = 1$	$v_0 = 0.6$	$v_0 = 1.5$

Preparation and operation

● Store the program written on the next page.

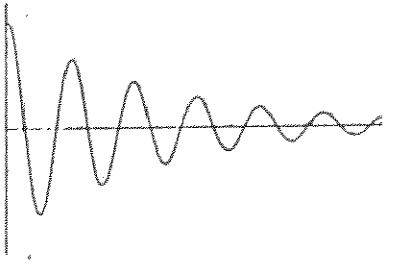
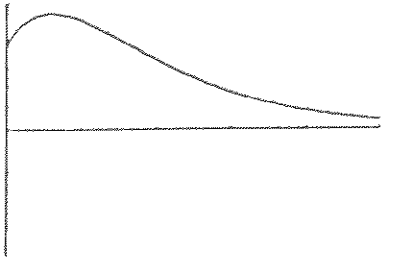
Memory contents

A	x_0	H		O		V	
B	v_0	I		P	$P_1 = -\varepsilon + \sqrt{\varepsilon^2 - n^2}$	W	
C	$\sqrt{n^2 - \varepsilon^2}$	J		Q	$P_2 = -\varepsilon - \sqrt{\varepsilon^2 - n^2}$	X	t
D		K		R		Y	x
E	ε	L		S		Z	
F		M		T			
G		N	n	U			

Line	MODE 2 Program															Notes	Number of steps
1	Rad	↵															2
2	Range	0	.	2	5	.	5	,	(−)	3	,	3	,	1	↵		17
3	"	E	P	S	I	L	O	N	=	"	?	→	E	↵			31
4	"	N	=	"	?	→	N	↵									39
5	"	X	0	=	"	?	→	A	↵								48
6	"	V	0	=	"	?	→	B	↵								57
7	E	>	N	⇒	Goto	1	↵										64
8	E	=	N	⇒	Goto	2	↵										71
9	√‾	(	N	x^2	−	E	x^2	)	→	C	↵						82
10	Graph	e^x	(	(−)	E	X	)	(	A	cos	(	C	X	)	+		97
11	(	B	+	E	A	)	C	x^{-1}	sin	(	C	X	)	)	↵		112
12	Goto	0	↵														115
13	Lbl	1	↵														118
14	(−)	E	+	√‾	(	E	x^2	−	N	x^2	)	→	P	↵			132
15	(−)	E	−	√‾	(	E	x^2	−	N	x^2	)	→	Q	↵			146
16	Graph	(	B	−	A	Q	)	(	P	−	Q	)	x^{-1}	e^x	(		161
17	P	X	)	−	(	B	−	A	P	)	(	P	−	Q	)		176
18	x^{-1}	e^x	(	Q	X	)	↵										183
19	Goto	0	↵														186
20	Lbl	2	↵														189
21	Graph	(	A	+	(	B	+	E	A	)	X	)	e^x	(	(−)		204
22	E	X	)	↵													208
23	Lbl	0															210
24																	
25																Total 210 steps	
26																	
27																	
28																	
29																	
30																	
31																	
32																	
33																	
34																	
35																	
36																	

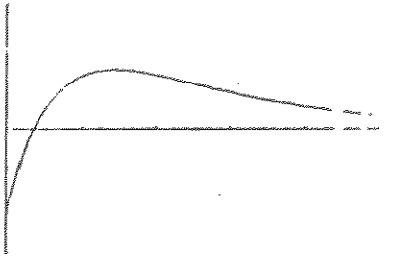
Program for
Graph variation by parameters

No. 11

Step	Key operation	Display
1	[Prog] 0 [EXE] 0.1 [EXE] 1.5 [EXE] 2.5 [EXE]	Prog 0 EPSILON=? 0.1 N=? 1.5 X0=? 2.5 V0=?
2	1 [EXE]	
3	[Prog] 0 [EXE] 0.2 [EXE] 0.2 [EXE] 2 [EXE]	Prog 0 EPSILON=? 0.2 N=? 0.2 X0=? 2 V0=?
4	0.6 [EXE]	

Program for
Graph variation by parameters

No. 11

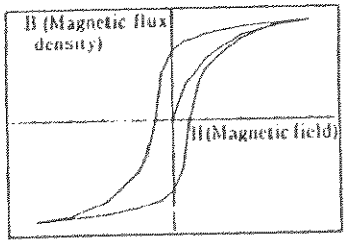
Step	Key operation	Display
5	[Prog] 0 [EXE] 0.2 [EXE] 0.18 [EXE] [(−)] 2 [EXE]	Prog 0 EPSILON=? 0.2 N=? 0.18 X0=? −2 V0=?
6	1.5 [EXE]	
7		
8		

Program for

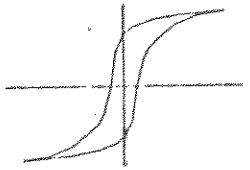
Hysteresis loop

No. 12

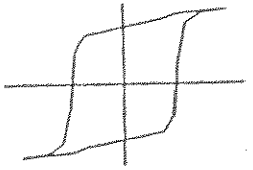
Description



When a ferromagnetic specimen is sustained in a magnetic field, the specimen becomes magnetized. The B-H relationship can be represented by a hysteresis curve.



Soft magnetic substance



Ferromagnetic substance

Example

Hysteresis curve of soft magnetic material

	1	2	3	4	5	6	7	8	9
H	0.4	1.0	2.0	3.0	4.0	2.0	1.0	0.5	0.3
B	0.5	0.86	1.2	1.32	1.4	1.31	1.22	1.13	1.1

	10	11	12	13	14	15	16	17
H	0	−0.3	−0.5	−0.8	−1.0	−2.0	−3.0	−4.0
B	0.96	0.66	0	−0.53	−0.72	−1.15	−1.33	−1.4

Number of data items: 17

- Number of data items in the main loop: 12

* Within 20 data items.

Preparation and operation

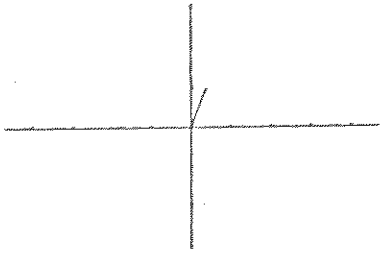
● Store the program written on the next page.

Memory contents

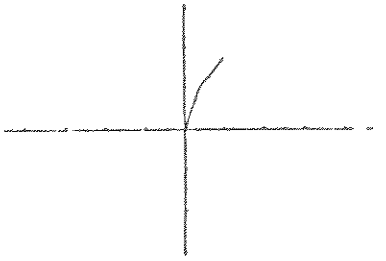
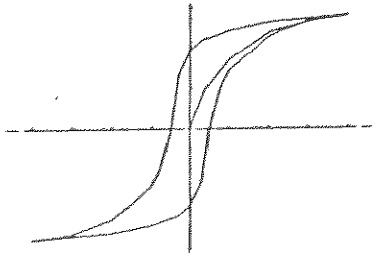
A	Number of data items	H		O		V	
B	Number of data items in the main loop	I		P		W	
C		J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T			Z(1)~Z(20) B
G	F(1)~F(20) B	N		U			

Line	Program	Notes	Number of steps
1	Range (−) 4 . 7 , 4 . 7 , 1 , (−) 1 .		15
2	S 5 . 1 . 5 5 , 0 . 5 ↵		27
3	Delm 2 0 ↵		31
4	" N O . SPACE O F SPACE D A T A " ? →		46
5	A ↵ Lbl 9 ↵		51
6	" M A I N SPACE L O O P ↵		62
7	N O . SPACE O F SPACE D A T A " ? → B		77
8	↵		78
9	B > 2 0 ⇒ Goto 9 ↵		86
10	I → C : Plot 0 , 0 ↵		95
11	Lbl 0 : " H = " ? → F (C) ↵		109
12	" B = " ? → Z (C) ↵		120
13	Plot F (C) , Z (C) : Line ◢		133
14	C + I → C ↵		139
15	C * A + I ⇒ Goto 0 ↵		148
16	A − B + I → D ↵		156
17	Lbl I : Plot (−) F (D) , (−) Z (D)		171
18	: Line ↵		174
19	D + I → D ↵		180
20	D * A + I ⇒ Goto I ↵		189
21	" E N D "		194
22			
23			
24		Memory 20×8=160	
25			
26		Total 354 steps	
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			

Program for: Hysteresis loop	No: 12

Step	Key operation	Display
1	[Prog] 0 [EXE]	Prog 0 NO. OF DATA?
2	17 [EXE]	Prog 0 NO. OF DATA? 17 MAIN LOOP NO. OF DATA?
3	12 [EXE]	Prog 0 NO. OF DATA? 17 MAIN LOOP NO. OF DATA? 12 H=?
4	0.4 [EXE] 0.5 [EXE]	

Program for: Hysteresis loop	No: 12

Step	Key operation	Display
5	[EXE] 1.0 [EXE] 0.86 [EXE]	
6	Input data in order. ⋮	
7	[EXE]	−1.33 don H=? −4 B=? −1.4 don END
8	[G↔T]	

Program list

Program for: **Regression curve** | No. 13

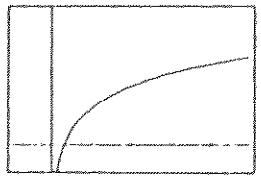
Description

i Logarithmic regression curve

Regression formula: $y = A + B\ln x$

$$B = \frac{n \cdot \Sigma(y \cdot \ln x) - \Sigma \ln x \cdot \Sigma y}{n\Sigma(\ln x)^2 - (\Sigma \ln x)^2}$$

$$A = \frac{\Sigma y - B \cdot \Sigma \ln x}{n}$$

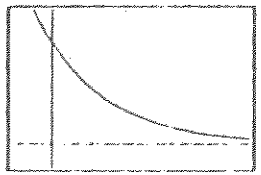


ii Exponential regression curve

Regression formula: $y = A \cdot e^{Bx}$

$$B = \frac{n\Sigma(x \ln y) - \Sigma x \cdot \Sigma \ln y}{n \cdot \Sigma x^2 - (\Sigma x)^2}$$

$$A = e^{\left(\frac{\Sigma \ln y - B \cdot \Sigma x}{n}\right)}$$

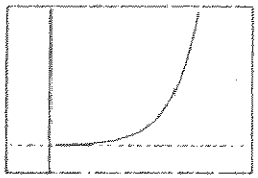


iii Power regression curve

Regression formula: $y = A \cdot x^B$

$$B = \frac{n\Sigma(\ln x \cdot \ln y) - \Sigma \ln x \cdot \Sigma \ln y}{n \cdot \Sigma(\ln x)^2 - (\Sigma \ln x)^2}$$

$$A = \frac{\Sigma \ln y - B \cdot \Sigma \ln x}{n}$$



* See page 176 for an example.

Preparation and operation

● Store the program written on the next page.

Memory contents

A	A or ln A	H	$\Sigma(\ln x)^2$	O		V	Σx
B	B	I		P	Σy^2	W	n
C	$\Sigma \ln x$	J		Q	Σy	X	x data
D	$\Sigma \ln y$	K		R	Σxy	Y	y data
E	$X\Sigma \ln y$	L		S	For selection of 1–3	Z	
F	$Y\Sigma \ln x$	M		T			
G	$\Sigma(\ln x \cdot \ln y)$	N		U	Σx^3		

No. 13

Line	Program	Notes	Number of steps
1	P0 [SHIFT] [MODE] [÷] → LR 2		
2	Scl . Cls : 0 → C ~ H ↵		10
3	" Range 0 K ? " ◢		17
4	" D A T A SPACE I N ~ E N D → ↵		31
5	A C → Prog 1 SPACE E X E " ↵		42
6	Lbl 1 ↵		45
7	" X : " ? → X ↵		53
8	" Y : " ? → Y ↵		61
9	ln X + C → C : ln Y + D → D : X		76
10	ln Y + E → E : Y ln X + F → F :		91
11	ln X × ln Y + G → G : (ln X) x^2		106
12	+ H → H ↵		111
13	X , Y DT ◢		116
14	Goto 1		118
15			
16	P1 [MODE] [÷] → COMP		
17	" Y = A + B ln X SPACE → 1 ↵		12
18	Y = A × e^x (B X) SPACE → 2 ↵		25
19	Y = A X X x^y B SPACE SPACE → 3 ↵		37
20	1 ~ 3 : " ? → S ↵		46
21	S = 1 ⇒ Prog 7 ↵		53
22	S = 2 ⇒ Prog 8 ↵		60
23	S = 3 ⇒ Prog 9 ↵		67
24	" E N D "		72
25			
26	P2 [SHIFT] [MODE] [÷] → LR 2		
27	(W F ~ C O) (W H ~ C x^2) x^2		15
28	→ B : (Q ~ B C) W x^2 → A ↵		29
29	Graph A + B ln X ◢		36
30	" A : " ◢ A ◢		43
31	" B : " ◢ B ◢		50
32			
33			
34			
35			
36			

CASIO PROGRAM SHEET

Program for	No.
Regression curve	13

Example

Perform exponential regression of the following data:

x_i	2.2	5.6	9.5	13.8	18.0	23.2	29.9	37.8
y_i	35.6	28.1	23.0	17.9	12.9	10.2	6.2	4.0

Draw an exponential regression curve, and use the trace function to estimate the value for y when $X = 20$. Also, obtain the values of A and B of the regression formula.

Range values:

X min : −10 Y min : −10
X max : 50 Y max : 55
X scl : 10 Y scl : 10

Preparation and operation

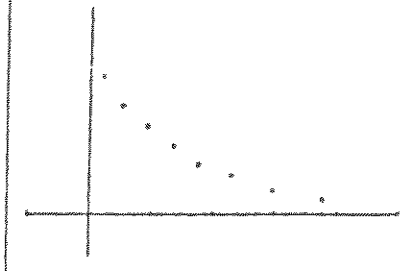
● Store the program written on the next page.

Memory contents

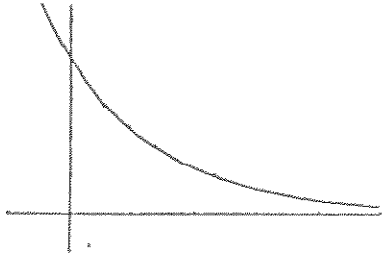
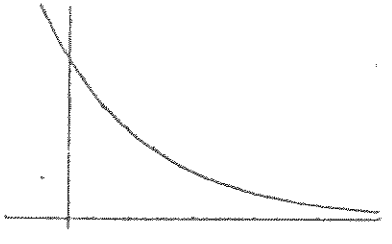
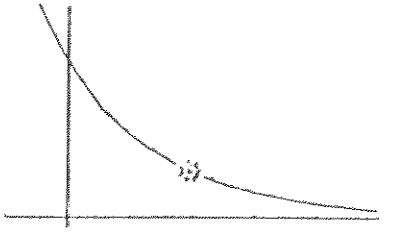
A		H		O		V	
B		I		P		W	
C		J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T			
G		N		U			

No. 13

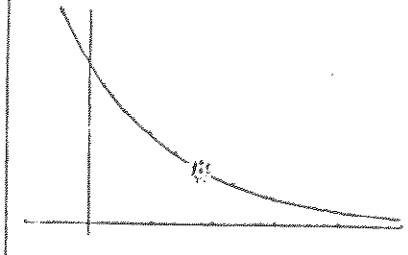
Line	Program	Notes	Num. of steps
1	MODE [2]		
2	P8 [Shift] [÷] → LR Z		
3	(W E − V D) (W) − V x^2) x^{-1}		1
4	→ B : (D − B V) W x^{-1} → A ↵		2
5	Graph e^x A × e^x B X ◢		3
6	" A : " ◢ e^x A ◢		4
7	" B : " ◢ B ◢		5
8			
9	P9 [Shift] [MODE] [÷] → LR Z		
10	(W G − C D) (W) − C x^2) x^{-1}		1
11	→ B : (D − B C) W x^{-1} → A ↵		2
12	Graph e^x A × X x^2 B ◢		3
13	" A : " ◢ e^x A ◢		4
14	" B : " ◢ B ◢		5
15		Total 344 steps	
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			

Step	Key operation	Display
1	[Prog] 0 [EXE] (Range setting check)	Prog 0 Range OK? – Disp –
2	Set range values. [Range] [(–)] 10 [EXE] 50 [EXE] 10 [EXE] [(–)] 10 [EXE] 55 [EXE] 10	Range Xmin:–10 max:50 scl:10 Ymin:–10 max:55 scl:10_
3	[EXE] [EXE] After data input is complete, press the [AC] key and execute the program in Prog 1.	Prog 0 Range OK? DATA IN ~END→ AC→Prog 1 EXE X:?
4	2.2 [EXE] 35.6 [EXE]	DATA IN ~END→ AC→Prog 1 EXE X:? 2.2 Y:? 35.6 2.2 – Disp –
5	[EXE]	DATA IN ~END→ AC→Prog 1 EXE X:? 2.2 Y:? 35.6 2.2 X:?
6	Input data in order. ⋮	
7	4.0 [EXE]	6.2 29.9 X:? 37.8 Y:? 4.0 37.8 – Disp –
8	[G↔T]	

Program for: Regression curve	No. 13

Step	Key operation	Display
9	[AC] [Prog] 1 [EXE]	Prog 1 Y=A+B ln X →1 Y=AXe(BX) →2 Y=AXXx'B →3 1~3 : ?
10	2 [EXE] (Select exponential regression).	
11	[SHIFT] [Trace]	 X=−4.893617021
12	[↪] ~ Move pointer to X=20	 X=20.

Program for: Regression curve	No. 13

Step	Key operation	Display
13	[SHIFT] [x⟷y]	 Y=11.86149086
14	[EXE] [EXE]	Y=AXe(BX) →2 Y=AXXx'B →3 1~3 : ? 2 done A : 40.68214077 — Disp —
15	[EXE] [EXE]	1~3 : ? done A : 40.68214077 B : −0.06162460519 — Disp —
16	[EXE]	1~3 : ? 2 done A : 40.68214077 B : −0.06162460519 END

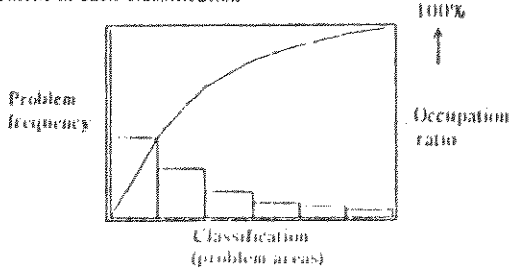
Program for: **Parade diagram** | No. 14

Description

One example of a parade diagram application is problem solving in QC activities. The problem is quantitatively analyzed based on actual data concerning its extent, and the main points demanding attention are determined.

Horizontal axis : Problem classification
(Item 6 in this example)

Vertical axis : (Right) Occupation ratio
(Left) Problem extent in each classification



Example

Create a parade diagram using the data on the right.

Problem areas	Frequency
A	105
B	65
C	35
D	20
E	15
Others	10

Preparation and operation

● Store the program written on the next page.

Memory contents

A	Input data	H		O		V	
B		I		P		W	n
C		J		Q		X	Count of data
D		K		R		Y	
E		L		S	Display count	Z	Sum of data
F		M		T			Z(1)~Z(6)
G		N		U			

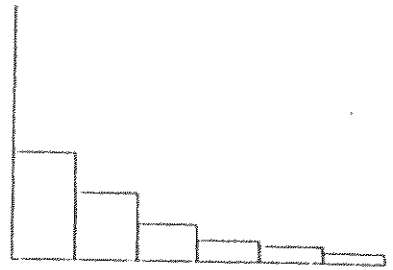
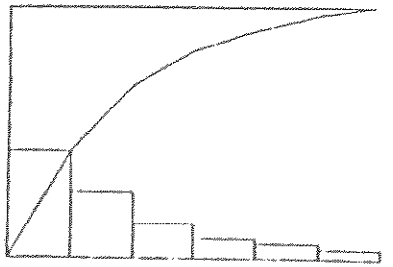
No. 14

Line	Program	Notes	Number of steps
1	P0 [SHIFT] [MODE] [X] → SD2		
2	Scl : Mcl : Defm 6 ↵		7
3	Range 0 , 6 , 1 , 0 , 5 0 0 , 5 0		22
4	↵		23
5	Lbl 1 ↵		26
6	" D " T A " ? → A ↵		36
7	X : A DT ↵		41
8	X + 1 → X : X ≤ 5 ⇒ Gto 1 ↵		54
9	Range , , , , W , W ÷ 1 0 ↵		66
10	Graph ◢		68
11	Plot 0 , 0 ↵		73
12	1 → S ↵		77
13	Lbl 2 ↵		80
14	Z (S) + Z → Z ↵		89
15	Plot S , Z : Line ↵		96
16	S + 1 → S : S ≤ 6 ⇒ Gto 2 ↵		109
17	Graph W		111
18			
19		Memory 6X8=48	
20			
21		Total 159 steps	
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			

Program for: Parade diagram	No. 14

Step	Key operation	Display
1	Prog 0 EXE	Prog 0 DATA?
2	105 EXE	Prog 0 DATA? 105 DATA?
3	65 EXE	Prog 0 DATA? 105 DATA? 65 DATA?
4	Input data in order. ⋮	

Program for: Parade diagram	No. 14

Step	Key operation	Display
5	10 EXE (Bar graph display)	
6	EXE (Parade diagram display)	
7		
8	⋮	

CASIO PROGRAM SHEET

gram for | No.

escription

Example

Preparation and operation

ep	Key operation	Display	Step	Key operation	Display
1			11		
2			12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

No.

Line	MODE 2 Program	Notes	Number of steps
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

Memory contents

A		H		O		V	
B		I		P		W	
C		J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T			
G		N		U			

CASIO PROGRAM SHEET

Program for	No.

Example

Preparation and operation

Memory contents								
A		H		O		V		
B		I		P		W		
C		J		Q		X		
D		K		R		Y		
E		L		S		Z		
F		M		T				
G		N		U				

No.

Line	MODE [2] Program	Notes	Number of steps
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
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