Scientific Calculator

owever:  $-1x10^{100} \le (1/x) \log |y| \le 100$ 

10 digits or less (including division marks).

y | < 1x10<sup>50</sup>

 $\ln I < 1x10^{100}$ 

 $x\sigma_n, y\sigma_n, \overline{x}, \overline{y}: n \neq 0$ 

 $x\sigma_{n-1}, y\sigma_{n-1}, A, B, r, : n \neq 0, 1$ 

DEC: Positive : 0 ~ 2147483647

Negative: -2147483647 ~ -1

Negative: 8000 0000 ~ FFFF FF

11

OCT: Positive : 0 ~ 177 7777 7777

HEX: Positive : 0 ~ 7FFF FFFF

Total of integer, numerator, and denominator must be

BIN: Positive : 0~0111 1111 1111 1111 1111 1111 1

Negative: 200 0000 0000 ~ 377 7777 7777

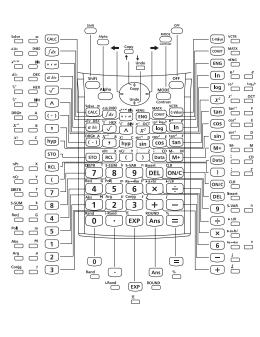
1111 1111 1111 1111 1111 1111 1111 1111

NO.	Constant	Symbol	Value	Uı
1.	Proton mass	mp	1.67262171 x10 <sup>-27</sup>	k
2.	Neutron mass	m <sub>n</sub>	1.67492728 x10 <sup>-27</sup>	k
3.	Electron mass	m <sub>e</sub>	9.1093826x10 <sup>-31</sup>	k
4.	Muon mass	mμ	1.8835314x10 <sup>-28</sup>	k
5.	Bohr radius α / 4πR ∞	a <sub>0</sub>	0.5291772108x10 <sup>-10</sup>	n
6.	Planck constant	h	6.6260693 x10 <sup>-34</sup>	J
7.	Nuclear magneton e $\hbar$ / 2m <sub>p</sub>	$\mu_N$	5.05078343 x10 <sup>-27</sup>	JT
8.	Bohr magneton e $\hbar$ / 2m <sub>e</sub>	μв	927.400949 x10 <sup>-26</sup>	JT
9.	h/2π	ħ	1.05457168 x10 <sup>-34</sup>	J
10.	Fine-structure constant	cx	7.297352568x10 <sup>-3</sup>	
	$e^2/4\pi\epsilon_0\hbar c$			
11.	Classical electron radius a 2a0	r <sub>e</sub>	2.817940325 x10 <sup>-15</sup>	n
12.	Compton wavelength h / m <sub>e</sub> c	λς	2.426310238 x10 <sup>-12</sup>	n
13.	Proton gyromagnetic ratio 2μ <sub>p</sub> /ħ	γp	2.67522205 x10 <sup>8</sup>	s -1
14.	Proton Compton wavelength $h/\mathrm{m_p}\mathrm{c}$	λ <sub>c,p</sub>	1.3214098555 x10 <sup>-15</sup>	n
15.	Neutron Compton wavelength $h/\mathrm{m_nc}$	λ <sub>c,n</sub>	1.3195909067x10 <sup>-15</sup>	n
16.	Rydberg constant $\alpha^2 m_e c / 2 h$	R∞	10973731.568525	m
17.	(unified) atomic mass unit	u	1.66053886 x10 <sup>-27</sup>	k
18.	Proton magnetic moment	μр	1.41060671x10 <sup>-26</sup>	JΤ
19.	Electron magnetic moment	μe	-928.476412 x10 <sup>-26</sup>	JΤ
20.	Neutron magnetic moment	μn	-0.96623645 x10 <sup>-26</sup>	JT
21.	Muon magnetic moment	μμ	-4.49044799 x10 <sup>-26</sup>	JT
22.	Faraday constant N <sub>A</sub> e	F	96485.3383	C m
23.	Elementary charge	е	1.60217653x10 <sup>-19</sup>	C
24.	Avogadro constant	NA	6.0221415x10 <sup>23</sup>	mo
25.	Boltzmann constant R / N <sub>A</sub>	k	1.3806505 x10 <sup>-23</sup>	JК
26.	Molar volume of ideal gas RT / p	Vm	22.413996 x10 <sup>-3</sup>	m <sup>3</sup> m
	T=273.15 K, p=101.325 kPa			
27.	Molar gas constant	R	8.314472	J mol
28.	Speed of light in vacuum	c <sub>0</sub>	299792458	m s
29.	First radiation constant $2\pi hc^2$	C <sub>1</sub>	3.74177138x10 <sup>-16</sup>	Wi
30.	Second radiation constant hc/k	c <sub>2</sub>	1.4387752 x10 <sup>-2</sup>	m

21

Thank you for purchasing Canon Scientific Calculator, The "F-788dx" features 497 scientific, statistical and other advance functions such as Integration & Differential Calculations, Matrix Calculation, Vector ISPLAY (2-LINE DISPLAY) .. Calculation, 79 Scientific Constants, 170 Metric Conversion and We recommend you to read this user manual and all the important Display Contrast Adjustme notices before start using F-788dx. And please keep this user manual with you for future use. Display Formats Setting . Input Editing ......Replay, Copy and Multi-statements
Calculation Stacks ......

## KEY ASSIGNMENT



8) Permutations (nPr) and combinations (nCr), Angle (∠). 9) Dot(•) 10) x, ÷

### Order of Operations

CONTENTS

ower ON, OFF ...

MODE Selection .

Order of Operations .

Arithmetic Calculations

Memory Calculations ..

Metric Conversions ...

Reciprocal and Pi ...

Angle Unit Conversion

STATISTICAL CALCULATIONS ...

Differential Calculations

Integration Calculations

Matrix Calculations

ADVICE AND PRECAUTIONS .......
BATTERY REPLACEMENT .....

SPECIFICATIONS ......

PUB NO. E-IE-370

igonometry Calculations

ition Calculations .

ADVANCED SCIENTIFIC CALCULATIONS ..

BASIC CALCULATIONS

Calculation Accuracy, Input Ranges .

rror Messages and Error Locator

Percentage Calculations
Degree-Minutes-Seconds Calculations ...
Constant Value Calculations

Engineering Notation Calculations .

FUNCTIONAL SCIENTIFIC CAI CUI ATIONS

n Calculations and Logical Calculations .....

nutation, Combination, Factorials and Random

\*For a single calculation, the calculation error is  $\pm 1$  at the  $10^{th}$  digit.

For exponential display, calculation error is ±1 at the last significan

digit. Errors are cumulative in the case of consecutive calculations,

which can cause them to become larger. (This is also true as internal consecutive calculations are performed in the case of  $\Lambda(x^y)$ ,  $x\sqrt{y}$ , x!,

nPr, nCr, etc.) In the vicinity of a function's singular point and point of

inflection, errors are cumulative and may become large.

TO GET START

The calculator will automatically determine the operation priority. This means that algebraic expressions can be entered just as they are

written and the calculation priority is as follows: Coordinate transformation : Pol(x, v), Rec(r, θ) Differential and Integration Normal distribution : P( , Q( , R( Logarithm with a, b variables : log<sub>a</sub>b(a, b) Random Integer Number Generation: i~Rand(A, B)

Type A functions Engineering symbols Normal distribution

 $: \hat{\chi}, \hat{\chi_1}, \hat{\chi_2}, \hat{\chi}$ the above function kev(s)

5) Abbreviated multiplication format in front of  $\pi$ , e(natural logarithm base), memory name, or variable name :  $2\pi$ , 3e, 5A,  $A\pi$ , etc.

Abs, Conjg.

Constant

Magnetic flux quantum h / 2e Φ

Conductance quantum 2e<sup>2</sup> / h

Characteristic impedance of vacuum

Standard acceleration of gravity

Celsius temperature

Standard atmosphere

Planck mass (fi c / G)1

Atomic mass constant

7. Electron volt: (e / C)J

Molar planck constant

Newtonian constant of gravit

Planck length  $\hbar/$  mpc= $(\hbar G/c^3)^{1/2}$ 

Planck time  $I_P$  /  $c=(\hbar G/c^5)^{1/2}$ 

Lattice parameter of Si(in vacuum, 22.5°C)

Hartree energy e<sup>2</sup> / 4 π ε <sub>0</sub>a<sub>0</sub>

Loschmidt constant N<sub>A</sub> / Vm

Inverse of conductance quantum

Electron gyromagnetic ratio

Muon magnetic moment anomaly a

2|μ<sub>e</sub>|/ħ

sephson constant 2e / h

Von Klitzing constant h / e<sup>2</sup> R<sub>K</sub> 25812.807449

Thomson cross section  $(8 \pi/3)r_e^2$   $\sigma_e$  0.665245873 x10

Electron magnetic moment anomaly a<sub>e</sub> 1.1596521859 x10<sup>-7</sup>

efan-Boltzmann constant

7) Abbreviated multiplication format in front of Type B functions 2√3, Alog2, etc.

### 12) and

are performed from left to right

Operations of the same precedence are performed from right

left. For example: e<sup>x</sup>ln√120 → e<sup>x</sup>{ln(√120)}. Other operations

Operations enclosed with parentheses are performed first. When a

The calculator is locked up while an error message is shown on the

positioned under the error and you can correct it accordingly.

Action

Check your input values and make sure they are all within the allowable

memory areas you are using.

Simplify the calculatio

The numeric stack has levels and the operator

Divide your calculation in

stack has 24 levels.

■ Press ← or → to display the calculation with the cursor

Cause

itside the allowable

An attempt to perform a ranges. Pay special

calculation using a value attention to values in an

Calculation result is

calculation range

that exceeds the allowable input range.

An attempt to perform an

illogical operation

ack is exceeded.

division by zero, etc.)

13

calculation contains an argument that is a negative number, the

negative number must be enclosed within parentheses **Example:**  $(-2)^4 = 16$ ; and  $-2^4 = -16$ 

Error Messages and Error Locator

■ Press (oN/c) to clear the error, or

Stack ERROR The capacity of the

Error Message

Math ERROR

13) xnor, xor, or

Cube, Square, Reciprocal, Factorial : x3, x2, x-1, x!, o' "

Regression value Angle unit conversions Metric conversions To perform type A function, input calculation value then press

Powers and roots : ∧(x<sup>y</sup>), <sup>x</sup>√

4) Fraction : a b/c, b/c

 $\sqrt{.3}\sqrt{.}$  log. In. e<sup>x</sup>. 10<sup>x</sup>. sin. cos. tan. sin<sup>-1</sup>. cos<sup>-1</sup>. tan<sup>-1</sup>. sinh. cosh.

anh, sinh-1, cosh-1, tanh-1, (-), d, h, b, o, Neg, Not, Det, Trn, arg, To perform type B function, press the above function key(s) then input calculation value

# 12

483597.879 x10<sup>9</sup> Hz V<sup>-1</sup>

λ<sub>c</sub> 386.1592678 x10

ool	Value	Unit	NO.	Constant	Symbol	Value	
	5.670400x10 <sup>-8</sup>	W m <sup>-2</sup> K <sup>-4</sup>	63.	Muon Compton wavelength h / m <sub>µ</sub> c	λς,μ	11.73444105 x10 <sup>-15</sup>	
	8.854187817 x 10 <sup>-12</sup>	F m <sup>-1</sup>	64.	$\lambda_{c,\mu}/2\pi$	λc,μ	1.867594298 x10 <sup>-15</sup>	
)	1.2566370614x10 <sup>-6</sup>	N A <sup>-2</sup>	65.	Tau Compton wavelength h / m τ c	λ c, τ	0.69772 x10 <sup>-15</sup>	
)	2.06783372 x10 <sup>-15</sup>	Wb	66.	λ <sub>c,τ</sub> /2π	λ <sub>c,τ</sub>	0.111046 x10 <sup>-15</sup>	
	9.80665	m s <sup>-2</sup>	67.	Tau mass	mτ	3.16777 x10 <sup>-27</sup>	
)	7.748091733x10 <sup>-5</sup>	S	68.	λ <sub>c,p</sub> /2π	λ <sub>c,p</sub>	0.2103089104 x10 <sup>-15</sup>	
	376.730313461	Ω	69.	Shielded proton magnetic moment(H <sub>2</sub> O, sphere, 25°C)	μ' <sub>p</sub>	1.41057047 x10 <sup>-26</sup>	J
	273.15		70.	Neutron g-factor 2 μ n / μ N	gn	-3.82608546	
1	6.6742 x10 <sup>-11</sup>	m <sup>3</sup> kg <sup>-1</sup> s <sup>-2</sup>	71.	Neutron gyromagnetic ratio 2 μ μ η / /ħ	γn	1.83247183 x10 <sup>8</sup>	s
	5.585694701		72.	Deuteron mass	m <sub>d</sub>	3.34358335 x10 <sup>-27</sup>	
n	0.2100194157 x10 <sup>-15</sup>	m	73.	Deuteron magnetic moment	μd	0.433073482 x10 <sup>-26</sup>	J
"	1.616024x10 <sup>-35</sup>	m	74.	Helion mass	m <sub>h</sub>	5.00641214 x10 <sup>-27</sup>	
	5.39121 x10 <sup>-44</sup>	s	75.	Shielded helion magnetic moment(gas, sphere, 25°C)	μ'n	-1.074553024 x10 <sup>-26</sup>	J
•	2.17645 x10 <sup>-8</sup>	kg	76.	Shielded helion gyromagnetic ratio	γ'n	2.03789470 x10 <sup>8</sup>	s
ı	1.66053886 x10 <sup>-27</sup>	kg		2  μ' <sub>h</sub>   / ħ (gas, sphere, 25°C)	' "		
_	1.60217653 x10 <sup>-19</sup>	J	77.	Alpha particle mass	mα	6.6446565 x10 <sup>-27</sup>	
h	3.990312716x10 <sup>-10</sup>	J s mol <sup>-1</sup>	78.	Shielded proton gyromagnetic ratio	γ'p	2.67515333 x10 <sup>8</sup>	s
	2.8977685 x10 <sup>-3</sup>	m K		2 μ ' <sub>p</sub> / ħ (H <sub>2</sub> O, sphere, 25°C)			
	543.102122 x10 <sup>-12</sup>	m	79.	Proton magnetic shielding	σ'p	25.689 x10 <sup>-6</sup>	
1	4.35974417 x10 <sup>-18</sup>	J		correction 1-μ ' <sub>p</sub> / μ <sub>p</sub> (H <sub>2</sub> O, sphere, 25°C)			
	2.6867773 x10 <sup>25</sup>	m <sup>-3</sup>					_
1	12906.403725	Ω	! C	onstant value cannot perform	round	ng.	

Source: Peter J. Mohr and Barry N. Taylor, CODATA Recommended Values of the Fundamental Physical Constants: 2002, to be published in an archival journal in 2004.

**TO GET START** 

■ Auto Power Off Function:

Input Capacity

calculator will automatically power off.

Pressing - to make the display contrast darken

Pressing - to make the display contrast lighten

and the direction keys will not use up any step.

**BASIC CALCULATIONS** 

nessage [PROCESSING]

Arithmetic Calculations

 $(4 \times 10^{75})(-2 \times 10^{-79})$  4 EXP 7 5 ×

Iculation Expression

with or M+.

an - 45) ÷ (-2)

an (- 45 ÷ -2)

Memory Variables

Memory variable.

alculation Expression

Press owc to confirm and clear the screen.

Or press off contact to exit and return to the latest calculation.

step is used as each time you press one of the numeric key

F-788dx allows you to input a single calculation up to 79 steps. One

Starting from the 73rd step, the cursor changes from [  $\_$  ] to [  $\blacksquare$  ] that

single calculation with more than 79 steps, you should separate your

notifying the memory is running low. In case you need to input a

Press to enter COMP mode as you want to perform

+-×÷

Display (Resul

Display (Result

■ During the busy calculation, the calculator will display the

To calculate the negative values (excludes the negative)

exponent), you have to enclose them with parentheses

Operation

This Calculator supports 24-level of parenthetical expression

You can omit the close parentheses  $\bigcirc$  as the calculation ends

Operation

tan (-) 4 5 ÷ (-

tan ( (-) 4 5 ÷

When the number of ) is more than (, [Syntax ERROR] will

Memory Calculations

Ans M- M+ M 5TO RCL

There are 20 memory variables (0 through 9, A through F. M. X. Y

To store values into memory by pressing 50 + Memory variable

15

You can go back to the calculation mode instantly as the control key

is pressed within the category selection pages. But after selected the base conversion unit,  $\uparrow$ ,  $\downarrow$  or com keys will be invalid.

and Z) which store data, results, or dedicated values.

(-) (2 (• (5 )

netic keys, scientific calculation keys or Ans key. Shift, Alpha, MODE

Display Contrast Adjustment

First time operation:1. Pull out the battery insulation sheet, then the battery will be

2. Press the reset button by the tip of a ball pen or a sharp  $% \left( x\right) =\left( x\right) +\left( x\right) =\left( x\right) +\left( x\right) +\left( x\right) =\left( x\right) +\left( x$ 

(Power ON/Clear): Turns on the calculator when it is pressed

OFF (Power OFF): Turns off the calculator when it is pressed.

When the calculator is not used for about 7 minutes, the

Press Shift Contrast , the following display will be shown for LCD contrast

loaded and the calculator can be powered on

Power ON, OFF

# DISPLAY (2-LINE DISPLAY)

How to use the Slide Cover

as shown in the figure.

Open or close the cover by sliding

STO RCL hyp SD REG CPLX MATX VCTR EQN EIEE FIX SCI 12# Eng R↔I <Status Indicators>

: Hyperbolic key : Recall Memory : Statistic Mode : Regression Mode : Complex Number Calculation Mode : Matrix Calculation Mode : Vector Calculation Mode : Equation Calculation Mode

: Degree Mode : Radian Mode : Gradient Mode : Fixed-decimal Setting : Scientific Notation : Engineering Notation : Polar Coordinate : Angle value

: Switch between Real and Imaginary Number : Imaginary number : Multi-statements Display Disp : Undo

Cause Action Syntax ERROR An attempt to perform an illegal mathematical the calculation with the

	operation.	cursor located at the location of the error and make required corrections.
Arg ERROR	Improper use of an argument.	Press ← or → to display the location of the cause of an error and make required corrections.
Dim ERROR	Under Matrix and Vector mode, the dimension (row, column) over three.     An attempt to perform an illegal matrix/vector operation.	Press ← or → to display the location of the cause of an error and make required corrections.
Solve ERROR	Can't get the result by solve function.	Press ← or → to display the location of the cause of an error and make required

Before Using the Calculator

■ Check the current Calculation Mode Be sure to check the status indicators that indicate the curren calculation mode (CPLX, SD... etc) and angle unit setting (Deg, Rad Gra) before starting a calculation.

■ Return Calculation Mode to the initial setup You can return the calculation mode to the initial default by pressing

Shift Cust 2 (Mode) =

Calculation Mode : COMP Angle Unit Angle Unit : Deg
Exponential Display Format : Norm 1, Eng Off omplex Number Display Format : a+bi Fraction Display Format : a b/c

and this action will not clear the variable memories. Initialize the Calculator

Decimal Point Character

When you are not sure the current calculator setting, you are recommended to initialize the calculator (calculation mode "COMP" angle unit "Degree", and clear replay and variable memories) by performing the following key operations:

Shift CLR 3 (All)

Metric Conversions The calculator has 170 conversion pairs which allows you to convert

 Press (ONT), then you can enter the conversion menu. There are 7 category pages (distance, area, temperature capacity, weight, energy, and pressure) containing 34 metric symbols, you can press ↑ or ↓ to change the category selection In a category page, you can shift the selection cursor to left or right

Page Symbol Unit square foot square kilomete

ounce (troy or apothecary

centimeter of water

Operation Display 0 + 5 cowr (menu selection page) → feet m mil (confirm selection ft<sup>2</sup>) → → (=) (confirm the value  $10+5ft^2 \rightarrow m^2$  $10 + 5 ft^2 \rightarrow m^2$ 

**Example:** Convert  $10 + (5 \text{ ft}^2 \rightarrow \text{m}^2) = 10.4645152$ 

! If the converted result is overflow, [-E-] will be shown in the lower following scenario are valid: Scenario A - Keep selecting the other conversion value by pressing → or ←.
Scenario B - Clear the screen by ow and jump out the

Scenario C - Pressing com to jump back to previous

calculation screen.

Engineering Notation Calculations Following nine symbols can be used when engineering symbols are turned on by pressing from the LCD will display

25

[Eng].			
Operation:	Value	Unit	
Allpha k	Kilo	10 <sup>3</sup>	
Alpha M	Mega	10 <sup>6</sup>	
Alpha G	Giga	10 <sup>9</sup>	
Alpha T	Tera	10 <sup>12</sup>	
Alpha m	Mi <b>l</b> li	10 <sup>-3</sup>	
Alpha μ	Micro	10 <sup>-6</sup>	
Alpha n	Nano	10 <sup>-9</sup>	
Alpha p	Pico	10 <sup>-12</sup> 10 <sup>-15</sup>	
Alpha f	Femto	10 <sup>-15</sup>	

The following table shows the mode selection menu

Display Formats Setting Press of to start the calculation mode selection with the following

← COMP CPLX SD → 1 2 3

When pressing  $\longleftarrow$  or  $\stackrel{\text{MODE}}{\frown}$ , you can access the next (or previous) node selection page.

Mode COMP Normal Calculation Complex Number Calculation | CPL Statistical Calculation Regression Calculation BASE Base-n Calculation

EQN Equation Calculation

MATX Matrix Calculation VCTR Vector Calculation

Deg Degree

Rad Radian MODE MODE MODE C MODE ← ← 2 Sci Scientific Notation Exponential Notation

\*1 Display Setup Selection options First page : Press 1 [EngON] or 2 [EngOFF] for engineering symbols on or off.

: Press  $\fbox{1}$  [ab/c] or  $\fbox{2}$  [d/c] to specify mixed fraction or improper fraction display → → : Press 1 [Dot] or 2 [Comma] to specify decimal point

or 3- digits separator symbols : During complex mode press on the state of press  $\boxed{1}$  [a+bi] or  $\boxed{2}$  [r $\angle \theta$ ] to specify rectangular or polar coordinate form.

Example: 23 + 7 (Store to A), calculate sin (memory A), and clear

memory A		
Calculation Operation	Display (Upper Line)	Display (Lower Line)
23 + 7 sro _ A	23+7 <b>→</b> A	30.
sin RCL A =	sin A	0.5
0 sto	0 <b>→</b> A	0.

Independent Memory (subtract from memory); and the ory contents are retained even when the calculator is turned

 To clear independent memory (M), input (0) (sro) <sup>M</sup> When you want to clear all memory values, press Shift CLR 1

Answer Memory
The input values or the most recent calculation result will be input values of the most recent calculation result will be a final point antically stored into Answer Memory whenever you press =, , , , , , , , , , , , , , , , , o followed by a memory variables. If you continue with pressing an operator key  $(+, -, x, \div, x^2, x^3)$ i, x!, DRG▶, ^(xy), ×√, nPr and nCr), the displayed value will be changed into [Ans] plus the operator key. Then, you can perform a

new calculation with the latest Answer Memory. Iculation Operation Display (Upper) Display (Lower) 2 3 + 4 5 6 M+ 123+456M+ 335,241.

You can recall and use the latest stored Answer Memory by

pressing (Ans).		
Calculation Operation	Display (Upper)	Display (Lo
789900 — Ans =	789900 <b>–</b> Ans	45

Answer Memory is not updated as an error operation had bee

16

Operation Display (Upper) Display (Lower

0.0007962 n ▲

Example: Convert 0.0007962 second into nano-second =

) 0007962 = 0.0007962 μ 🔺

**Example:** 0.128 gram + 9.3 kilogram = 9300.128 gram

0 ● 128 + 9 ● 3 | 0.128 + 9.3k k ▲

You can change the number of decimal point, the number of

significant digits, or the exponential notation criteria by pressing

← Fix Sci Norm →

1 2 3

Press 1 (Fixed Decimal Setting) : [ Fix  $0 \sim 9$ ? ] appears on the

Press 2 (Scientific Notation) : [Sci 0 ~ 9?] appears on the

Fix, Sci, Norm, ROUND

← ← to the following selection screen:

79620000 x 10<sup>-09</sup>

t default setting.

digits)

fix 4 digits decimal point

erform internal rounding

er the specified decimal

o display by 6 digits scientific

o clear the FIX and Sci

nternal calculation continues

1 a b/c : Mixed fraction

[Math ERROR] will occurs if you input a mixed fraction and the improper [d/c] display format is selected.

17

Examples: 57 ÷ 7 x 20 = ?? Operation Display (Lower)

DDE - 1

57 ÷ 7 =

Shift ROUND × 20 =

MODE ← ← 2 6

162.8571429

162.8571

8.1429

162.8571

8.1429

162.8580

162.858

1.62858 x10

35.68163348

## Deletion (1234560 → 134560 )

F-788dx can display a result up to 10 digits. Results exceed the digit 1234560+8899 → limit will be automatically displayed by exponential notation format. You can enter a value in floating-decimal, fixed-decimal, or scientific '2" is deleted ↑ 134560+88990 → notation format and display format setting only affects the calculation Insertion (889900 → 2889900)

Press or keep pressing until "8" blinks

Undo (889900)

Resume "889900"

'8" and Dinks alternately

Shift Undo

the cleared segment and back to the previous display.

If pressed DEL... Owc to delete character(s) then clear the

the calculator cannot perform the "Undo" function.

Replay

Replay memory capacity is 128 bytes that can store calculation

its result will be stored in the replay memory automatically.

• Pressing ↑ (or ↓) can replay the performed calculation

expressions and results.

Replay memory is cleared when you.

i) Initialize calculator setting by hift car 2 =

(or 3 = ).
ii) Change from one calculation mode to another

After the calculation is executed, the calculation expression and

Replay, Copy and Multi-statements

After deleted an input by DEL or cleared the input by ONIC,

icon will be shown on the display.

• Press Shift Undo to resume up to 79 DEL deleted input or to undo

display, the calculator will prioritize the undo from resuming the

latest owc cleared characters, and followed with the deleted

After inserting a new data or executing a calculation command.

Insert "2", "8" still blinking

Clear "889900", Still blinking

characters continuously.

expressions and results.

expressions and results.

Example: Change the display formats for 1.23 x10<sup>-03</sup>

Display Setting	Operation	Display (Lower)
Default setting :		
Norm 1, EngOFF	123 💌 ● 00001 🖃	1.23 x10 <sup>-03</sup>
Scientific Notation :		
"5" significant digits	MODE ← ← 2 5	1.2300 x10 <sup>-03</sup>
Exponential Notation : Norm 2	MODE ← ← 3 2	0.00123
Fixed decimal places : "7"	MODE ← ← 1 7	0.0012300

Display Setting	Operation	Display		
Engineering Symbols : On	MODE ← 1 1	123x <b>-</b> 00001 m 1.23		
Display without engineering symbols	Shift 4ENG	123x <b>.</b> 00001 0.00123		
Input Editing ← → DEL hisert Unido				

are more than 12 digits, the line will scroll to the right consecutively Press ← → to scroll the cursor within the upper (entry) line and you can perform input editing as needed.

New input begins on the left of the upper (entry) line. As the entries

ry (1234567 → 1234560

Example (under editing): 1234567 (+) 889900

Replacing an entry (1234567 → 1234560)				
Operation	Display (Lower)			
-	123456 <u>7</u> +8899 →			
•	1234560 <u>+</u> 8899 →			
	,			

Percentage Calculations

Fraction Calculation, Fraction ← Decimal point conversion

The Calculator support Fraction Calculation and the conversion

between Fraction, Decimal point, Mixed fraction and Improper

Example	Operation	Display (Lower)
$1\frac{2}{3} + \frac{5}{6} = 2\frac{1}{2}$	1 @ b/c 2 @ b/c 3	
3 6 - 2 2	+ 5 a b/c 6 =	2 _ 1 _ 2.
$2\frac{1}{2} \longleftrightarrow 2.5$ (Fraction $\longleftrightarrow$	a b/c	2.5
Decimal)	a b/c	2د1د2.

· Result will be displayed in decimal format automatically whenever the total digits of a fractional value (integer + numerator + denominator + separator marks) exceeds 10.

As a fraction calculation is mixed with decimal value, the result will

be displayed by decimal format.

Decimal ←→ Mixed fraction ←→ Improper fraction conversio Example Operation Display (Lower) 5 • 25 =  $5.25 \longleftrightarrow 5\frac{1}{4}$ 

Fraction Operations

.4داد5 Decimal ← Mixed Fraction) (a ыс) ixed Fraction ↔ Shift a b/c 21」4. roper Fraction) · Fraction conversion may take as long as two seconds

You can specify the fraction calculation result (when the result

greater than one) display format by either mixed fraction or mproper fraction. Simply press <sup>MODE</sup> ← [Disp] 1 →, then press the corresponding setting you need:

2 b/c : Improper fraction

You can perform the following percentage calculations: Percentage of a value against another value (A 🔁 B Shift % ).

Example Operation Display (Upper) Display (Low 820 × 25 Shift % 820 x 25 % e percentage of 750 750 ÷ 1250 Shift

: "A" value mark up by "B%" (A ເ B Shift t + ) : "A" value have "B%" discount (A ເ B Shift t - ) Example Operation Display (Upper) Display (Lower) 

820 have 25% discount 820 x 25 5hift 5 820 x 25 % -Percentage Increase : If "A" is added to "B", the percentage increase from "B" is:  $\left(\frac{A+B}{B}\right)$  x 100% (A + B  $\stackrel{\text{shift}}{\bigcirc}$   $\stackrel{\text{\%}}{\bigcirc}$  )

Percentage Change : If "A" is changed into "B", the percentage change from "A" to "B" is:  $\left[\frac{B-A}{A}\right]$ % (A - B  $\stackrel{\text{Shift}}{\frown}$   $\stackrel{\text{left}}{\frown}$  )

Example Operation Display (Upper) Display (Lowe e percentage crease of 750 is 30 - 25 Shift % 30 - 25 %

18

The calculator default angle unit setting is "Degree". If you need to

change into "Radian" or "Gradient", you can press <sup>MODE</sup> a number of

← Deg Rad Gra →

### using a colon : The first executed statement will have [Disp] indicator; and the [Disp] icon will disappeared after the last statement is being

You can put two or more calculation expressions together by

current calculation expression.

Copy

• Press in after replayed the previous calculation after replayed the previous calculation in the previous calculation and the pre

expressions (statements) can make a multi-statement with the

134560+88990 →

134560+<mark>8</mark>8990 →

134560+2<mark>8</mark>899 →

↑ 134560+2[]

← 560+2889900[]

Operation	Display (Upper line)	Display (Lower Lir
8+9=	8 + 9	17.
5 × 2 Shift :_ Ans + 6 =	5 x 2	10.0
▣	Ans + 6	16.
↑ ↑ Shift Copy	9:5 x 2: Ans + 6	17.
▣	8 + 9	17.0
▣	5 x 2	10.0
▣	Ans + 6	16.

### Calculation Stacks

■ This calculator uses memory areas, called "stacks", to temporarily store numeric value (numbers) and commands (+ - x ...) according to their precedence during calculations. ■ The numeric stack has 10 levels and the command stack has 24

levels. A stack error [Stack ERROR] occurs whenever you try to perform a calculation that exceeds the capacity of stacks. Matrix calculations use up to two levels of the matrix stack.

Squaring a matrix, cubing a matrix, or inverting a matrix uses one

■ Calculations are performed in sequence according to "Order of Operations". After the calculation is performed, the stored stack values will be released.

Percentage Proportion: the ratio/percentage of each individua

If A + B + C = D

**Examples:** To calculate the ratio of each portion as 25+85+90=200 (100%), the ratio of 25 is 12.5%, 85 is 42.5%, 90 is 45%

85 ÷ A %

25 + 85 + 90 500 \* ↑ 25+85+90 → A

5 ÷ R□ \* A Shift % 25 ÷ A %

90 ÷ Alpha \* A Shift % 90 ÷ A %

85 ÷ RCL A Shift %

123°45'6"

123°45'6" →123.7516667

Operation Display (Upper) Display (Lower)

You can store the sum of value into memory variables, then recall and use the value by pressing [RCL] or Abha + Memory variable.

Degree-Minutes-Seconds Calculations

You can use degrees (hours), minutes and seconds key to perform a

Examples Operation Display (Lower)

sexagesimal (base-60 notational system) calculation or convert the sexagesimal value into decimal value.

⊕ 0.7 🖃

Degree-Minutes-Seconds ← Decimal points

86°37' 34.2" ÷ 0.7 = 86 · · · · 37 · · · · 34.2 · · · ·

2.3456 → 2°20'44" 2.3456 = Shift \*\*\*

portion in a calculation expression.

"A" is a% of "D" where a =  $\frac{A}{D}$  x 100%

0≤|x|≤9.999999999 x10 0< x ≤ 9.99999999x10<sup>9</sup> -9.999999999x10<sup>99</sup> ≤ x ≤ 230.2585092 0 ≤ x < 1x10<sup>100</sup>  $I \times I < 1 \times 10^{50}$ 

0 **≤** | x | **≤** 1

Calculation Accuracy, Input Ranges

Output ranges: ±1 x 10<sup>-99</sup> to ±9.99999

Accuracy\*: As a rule, accuracy is ±1 at the 10<sup>th</sup> digit

Deg 0≤|x|≤4.499999999x10

ad 0≤|x|≤785398163.3

Grad  $0 \le |x| \le 4.999999999 \times 10^{10}$ 

Deg 0≤|x|≤4.500000008x10<sup>10</sup>

Grad  $0 \le |x| \le 5.000000009 \times 10^{1}$ 

 $0 \le |x| \le 9.999999999 \times 10^{99}$ 

 $0 \le |x| \le 230.2585092$ 

0 ≤ | x | ≤ 4.999999999x10

1 ≤ x ≤ 4.999999999x10<sup>9</sup>

| x | ≤ 2.1544346933x

|x| < 1x10<sup>100</sup>; x ≠ 0

0 ≤ x ≤ 69 (x is an intege

10

| x | < 1x10<sup>100</sup>

0 ≤ | x | ≤ 785398164.9

Input Range

Same as sinx, except when | x | =90(2n-

Grad Same as sinx, except when | x | =100(2n-1)

Same as sinx, except when | x | =π/2(2n-1

Internal digits: Up to 16

Function

12.5

42.5

123 7516667

2°20°44.16

0.785398163

Constant Value Calculations F-788dx has total 79 constant values, you can enter (or exit) the stant value selection menu by pressing we, the following display will be shown:

> ← <u>0</u> <u>0</u> mp mn me → INPUL 1-79 · You can go to the next or previous value selection pages by

pressing ↑ or ↓.

To select a constant value simply press ← or → button. The selection cursor will shift left or right to underline a constant symbol and at the same time the display lower line will show the value of

the underlined constant symbol. The underlined constant symbol will be selected as you press 
You can instantly get the constant value if you input the constant

value item number and press = when the selection cursor is

Operation	Display
(menu selection page)	<u> 00 m<sub>p</sub> m<sub>n</sub> m<sub>e</sub></u> →
↓ →	← 0.4 m <sub>μ</sub> a <sub>0</sub> h 1.8835314 x10 <sup>-28</sup>
(confirm selection)	$m_{\mu} \\ 0.$
+ Cohin 35	<u>4</u> 35 m <sub>p</sub> m <sub>n</sub> m <sub>e</sub> ■ INPUL 1-79
==	m <sub>μ</sub> + g 9.80665

20

■ With polar coordinates, you can calculate and display  $\theta$  within

-180° < 0 ≤ 180° range. (Same as Radian and Gradient)

■ After conversion, results will automatically assigned to memory

 $\begin{tabular}{lll} \textbf{shift} & \begin{tabular}{lll} \textbf{shift$ 

Operation Display (Lower)

of r, or RCL  $\bigcap$  to display the value of  $\theta$ .

Coordinate Conversion

Examples

x =1,y =√3). Find Polar

rdinate (r, θ) at degree

variables E and F.

Trigonometric (sin/ cos/ tan), Inverse Trigonometric (sin-1/ cos-1/ tan-1) Functions Examples Operation MODE ← ← 1

1 2 3  $\bigcirc$  sin 45  $\bigcirc$  Shift xec x = 1/sinx sec 45° = 1.414213562 nen press the corresponding number key 1,2 angle unit you need. Then the display will show the D, R, or G -1 (5/6) = 39.80557109° Shift tan' ( 5 ÷ 6 = MODE ← ← 2 (ON/C) To convert an angle unit between "Degree", "Radian" and "Gradient"

tanh 1) Functions

Example: Convert 180 degree into radian and gradient

 $(180^{\circ} = \pi^{Rad} = 200^{Gad})$ 

D R G

Display (Upper) Display (Lower) R | 80 C DRG 1 = 3.14159265 Gradient mode) G

Trigonometry Calculations sin cos tan sin' cos tan hyp

28

■ Before using the trigonometric functions (except hyperbolic calculations), select the appropriate angle unit (Deg/ Rad/ Gad) by  $\stackrel{\text{mos}}{\leftarrow}$  .

 $\cos^{-1}\frac{1}{\sqrt{2}} = 0.25 \pi \text{ (Rad)}$ Hyperbolic (sinh/ cosh/ tanh), Inverse Hyperbolic (sinh-1/ cosh-1/

0.785398163 Shift cos 1 + 2

Examples Operation Display (Lower) sinh 2.5 – cosh 2.5 = hyp sin 2.5 — hyp cos 0.082084998 2.5 🖃 cosh<sup>-1</sup> 45 = 4.499686191 hyp Shift cos<sup>-1</sup> 45 = 4.499686191

Logarithm, Natural Logarithm, Antilogarithm and Logab log In 10x ex logab Examples Operation Display (Lower) log 255 + ln 3 = 3.505152469 log 255 + ln 3 = 3.505152469

or RCL to display the value of y.

conversion calculation. Complex Number Calculations i Abs Arg L +a+bi +rt0 Conjg

Complex numbers can be expressed by rectangular form (z = a + bi)

22 23 24 Norm 2: Exponential notation is automatically used for integration values with more than 10 digits and decimal values with more than nine decimal point.

26

message [PROCESSING].

Square, Root, Cube, Cube Root, Power, Power Root, Reciprocal **Example:**  $(\sqrt{-2^2 + 5^3}) \times \pi = 35.68163348$ 

-) 5 Shift # D D Shift # Press 3 (Exponential Notation) : [Norm 1 ~ 2?] appears. Then, you can specify the exponential notation format by pressing 1 or

display. Then, you can specify the

number of decimal places by

number of significant digits by

pressing 0 ~ 9.

pressing 0 ~ 9.

Norm 1: Exponential notation is automatically used for integer values with more than 10 digits and decimal values Operation with more than two decimal point. 

**FUNCTIONAL SCIENTIFIC CALCULATIONS** Press to enter COMP mode for performing functional

■ During the busy calculation, the calculator will display the  $\pi = 3.14159265359$ 

otation format by pressing 1 | MODE ← ← 3 1

Display (Upper) Display (Lower 

**Example:**  $(\sqrt[3]{2^6} + \sqrt[5]{243})^{-1} = 0.142857142$ 

Display (Upper) | Display (Lower) 243 ) Shift x = (<sup>3</sup>√2^6 + 5 ×√24

27

 $\int ((-2)^2 + 5^3) \pi$ 

1 2 3 Then, press  $\boxed{\ 1\ }$ ,  $\boxed{\ 2\ }$ , or  $\boxed{\ 3\ }$  will convert the displayed value into the

Angle Unit Conversion

times until you reach the setup screen:

MODE → → → 2 (Radian mode)

■  $90^{\circ} = \frac{\pi}{2}$ ; Radian = 100 Gradient.

+ 10<sup>1.2</sup> = 15.89871899 Shift e<sup>x</sup> (-) 3 + Shift to<sup>x</sup> 1 • 2 = Alpha logab 3 9 81 ) og<sub>3</sub>81 **– l**og 1 = 4 [log] 1 (=)

29

shift  $\stackrel{\text{Red}}{\square}$ : To converts polar coordinates (  $\underline{r}$  ,  $\theta$  ) to rectangular coordinates(x, y); Press RCL = to display the value of x.

Examples	Operation	Display (Lower		
With Polar coordinate	Shift Rec( 2 , 60 =	1.		
(r=2,θ=60°). Find rectangular	RCL	1.732050808		
coordinate (x,y) at degree mode	RCL E	1.		
L (Cyptox EDBOR) will be aboun if (1) is missed in the seardingto				

or polar form (r  $\angle \theta$ ). Where " a " is the real number part, " bi " is the imaginary number part (and i is the imaginary unit equal to square root of -1,  $\sqrt{-1}$ ), "r" is the absolute value, and " $\theta$ " is the argument of the complex number

[ i ] icon indicate the display result is imaginary number part

■ But the imaginary numbers will use up replay memory capacity. Displaying the complex number calculation result

 $\angle$  ] indicate the display value is the argument value  $\theta$ .

Pressing <sup>MODE</sup> ← 1 → , following display options will be shown:

# ← a+bi r∠θ

Rectangular form (Default setting) : Polar form (the  $[r \angle \theta]$  display indicator will be turned on).

**Example:** (12+3i) - (3+1i) = 9 + 2i = 9.219544457 (r) $\angle 12.52880771$  ( $\theta$ )

You can set up the complex number calculation result display forma

Operation (Angle Unit: Degree)	Display (U	oper)	Display (Lower)
(12 + 3 Shift i   -   -     -	(12+3i)-(3+i (12+3i)-(3+i	R <b>⇔I</b> A R <b>⇔I</b>	9. 2.i
MODE ← 1 → 2 (change	(12+3i)-(3+i	r∠θ R⊷I	∠ 12.52880771
display value)  Shift Re→Im  □	(12+3i)-(3+i	r∠θ R <b>⊶I</b>	9.219544457

Press hit is an convert rectangular form complex number into polar form; whereas press hit is will convert polar form complex **Example:**  $3 + 4i = 5 \angle 53.13010235$ 

Operation (Angle Unit: Degree) | Display (Upper) | Display (Lowe

operation (rangle office)	Bioplay (oppor)	Diopidy (Lov
3 + 4 Shift i Shift >r.00 =	3 + 4j > r∠θ R↔	
Shift Re →Im	3 + 4j > r∠θ R↔I	∠ 53.130102
	01	

### Permutation, Combination, Factorials and Random

• Permutation :  $nPr = \frac{n!}{(n-r)}$ 

• Combination :  $nCr = \frac{n!}{r!(n-r)}$ 

Factorial : x! = x(x-1)(x-2)....(2)(1)

Examples Operation

<sub>10</sub> P <sub>3</sub>	10 Shift nPr 3 =	7
<sub>5</sub> C <sub>2</sub>	5 Shift nCr 2 =	
5!	5 Shift x! =	
Random Number	Generation	

Shift Rand : To generate a random number between 0.000 and 0.999; the result differ each time with the same

Transpose a Matrix

MATX 1 2 (Dim) 3 =

9=5=6=2=8=

(press left, right, up or

Shift MATX 1 3 (Dim) 2 =

2 = ( Matrix C 2x2 )

Input Element

8=2=3=6=

down key to display the result) MatAns-

**Example:** Inverting Matrix  $C = \begin{bmatrix} 8 & 2 \\ 3 & 6 \end{bmatrix}$ 

2 (Matrix B 3x2)

4 = (Input Element )

possibility of occurrence. Shift i-Rand: To generate a random number between two specified positive integers. Results differ each time with the same

possibility occurrence within a boundary. The entry is

Example: To generate a random number between 0.000 and 0.999 and generate an integer from range of 1 to 100

\* The value is only a sample, results will differ each time.

41

Following procedures show you how to transpose a matrix:

**Example:** Transpose Matrix B =  $\begin{bmatrix} 6 & 2 \\ 5 & 2 & 4 \end{bmatrix}$  < Result:  $\begin{bmatrix} 6 & 6 & 6 \\ 5 & 2 & 4 \end{bmatrix}$ 

8 4

Det Trn

Following procedures show you how to invert a square matrix:

<Result: (0.142857142 -0.047619047)</p>
-0.071428571 0.19047619

Display (Upper) Display (Lower

-0.04761904

-0.0714285

Operation	Display (Upper)	Display (Lower)
Shift Rand	Rand	0.833*

divided with " .

Shift i-Rand 1 7 100 =

).			

Absolute Value and Argument Calculation With the rectangular form complex number, you can calculate the nding absolute value (r) or argument ( $\theta$ ) by  $\stackrel{\text{Shift}}{\longrightarrow}$  or

**Example:**  $645 + 321 - 23 \times 7 \div 2 = 1064$  (at Octal Mode)

OCT 12345 + DHEO DHEO DHEO 3 101

Base-n transformation  $\stackrel{\text{DEC}}{=} \rightarrow \stackrel{\text{OCT}}{=} \rightarrow \stackrel{\text{HEX}}{=} \rightarrow \stackrel{\text{BIN}}{=}$ 

(go to next block of the result) 12345+b101

01 🗦 10 🖃

Octal Calculation

(at Binary Mode)

Operation

**Example:** 10101011 + 1100 – 1001 x 101 ÷ 10 = 10100001

						,
Example: What's the absolute valu number is 6+8 <i>i</i>	e (r) and argume	nt (θ) if complex		645 + 321 - 23 × 7 ÷ 2 =	645+321 <b>-</b> 23x7	10
Operation (Angle Unit: Degree)	Display (Upper)	Display (Lower)	L		0.10.102.1.20%	
Shift Abs (6+8 Shift i =	Abs ( 6+8i *	10.		Hexadecimal Calculation	= 57C87 (at Heyada	ocimal Moc
→ Shift Arg =	arg ( 6+8i	53.13010235		Cample: (17A00 1 D3) X D 1	- 57 OUT (at Flexade	Cimal Woo

complex number should be z = a - bi. **Example:** The conjugate of 3 + 4i is 3 - 4i

Conjugate of a complex numbe

Operation (Angle Unit: Degree)	Display (Upper)	Display (Lower)
Shift Conjg (3+4 Shift i =	Conjg (3+4i <sup>R</sup> ⊶	3.
Shift Re→Im	Conjg (3+4i <sup>R</sup> →I	-4.i

If the complex number is z = a + bi, the conjugate value of this

### Base-n Calculations and Logical Calculations Press MODE (2) to enter Base-n mode for decimal (base 10). lecimal (base 16), binary (base 2), octal (base 8), or logical

- Default base number system is Decimal with [d] display indicator ■ To select a specific number system in base mode, simply press ©C Decimal [d], HEX Hexadecimal [H], Note 1 Binary [b], or
- The kev allows you to perform logical calculations includes: Xnor], argument complement [Not], and negation [Neg]. ■ If the binary or octal calculation result is more than 8-digit, [1b]
- [10] will be displayed to indicate the result has next block. Keep ressing [Blk] can loop between result blocks. ■ All the scientific functions cannot be used, and you cannot input
- the value with decimal place or exponent.

32

## ■ During the busy calculation, the calculator will display the

Unknowns?

	-	De	gree			
		2	3			
Afte	er the	equa	ation typ	oe is :	select	ed,

simultaneous linear equation:

← a1?		other related elements.
	0.	Element Value
(Sample display for simult	aneous linear equation	solve)
For quadratic or cub	ic equation solve,	the coefficient name starts

## ADVANCED SCIENTIFIC CALCULATIONS

Equation Calculations

	this screen, you can choose for the with either two (2) or three (3)	
to	lisplay another the options for qu	15

IEQNI indicator lights up. The

Coefficient na	ıme	Indicates the direction of next step or viewing the	
← a1?		other related elements.	
	0.	Element Value	
(Sample display for simultane	ous linear equation	ion solve)	

essage [PROCESSING].

unknowns. Or, press <sup>MODE</sup> or →

- Deg	iee:	
2	3	
r the equati		

owing equation solve guiding page sample will be shown if you ecified the equation solve for two (2) or three (3) unknowns

Coefficient name	next step or viewing the
<b>←</b> a1?	other related elements.
· ai:	· h
0.	Element Value
(Sample display for simultaneous linear equat	ion solve)
For quadratic or cubic equation cal	us the coefficient name starts

After you input the final coefficient of the specified equation ("c2 for two unknowns simultaneous equation, "d3" for three unknowns simultaneous equation, "c" for a quadratic equation, and "d" for a cubic equation), you can display or edit the value by scrolling the

42

Following procedures show you how to determine the absolute value

Example: To determine the absolute value of the inverted Matrix C in

Abs MatAns

MatAns<sub>22</sub>

Display (Upper) Display (Lower)

Determine the Absolute value of a Matrix

the previous example.

### Logical Operation

Examples (Hexadecimal Mode)	Operation	Display (Lower)
789ABC Xnor 147258	789 📥 🖶 🗂 🗀	
	3 147258 =	FF93171b. <sup>H</sup>
Ans Or 789ABC	Ans 2 789 A	
	- de la	FFFb9FbF. H
Neg 789ABC	DHBO DHBO 3 789 A	
	- i i = □	FF876544. <sup>H</sup>

(77A6C + D9) x B

12345+b101

14EA. H

10100.2b

! Beware of the allowable input range of each number system

The calculator will display the result of the equation by the following

Sample display for simultaneous linear equation solve

 For quadratic or cubic equation, the Variable name starts with Press ↑ ↓ or = key to display the equation solve results. If you want to return to the coefficient input screen, simply press

Two Unknowns Simultaneous Linear Equation  $a_2x + b_2y = c_2$ Three Unknowns Simultaneous Linear Equation

5x - 2y - 2z = 20

Simultaneous Linear Equations

 $a_1x + b_1y + c_1z = d_1$  $a_2x + b_2y + c_2z = d_2$ Example: Solve the simultaneous equation with three unknowns:

Operation	Display (Upper)	Display (Lower)
MODE MODE 3	Unknowns? →	2 3
3 (3 unknowns)	a1? 🕌	0.
2=4=-4=20=	a2? \$	0.
2=02=4=8=	a3? \$	0.
5 = (-) 2 = (-) 2 = 20 =	x =	5.5
▼	y = •	3.
■	Z =	0.75
(return to input screen)	a12	2

1. Press hift vcr 2 (Edit), then specify the vector A, B or C for

3. When finished the input, press owc to exit the vector editing

0.14285714 0.0714285 0.19047619

Operation

■ Enter the vector mode by pressing MODE MODE 2, and [VCTR] indicator lights up. ■ Before you start vector calculations, you have to create one or ore vector which named A, B, or C (maximum three vectors at

■ The vector calculation results are stored into VctAns memory automatically. You can use the vector VctAns memory for any

# Create a Vector 1. Press Shift Vent 1 (Dim) to specify the vector name (A, B or C),

and then specify the dimension of the vector.

2. Next, input the value (element) of the vector according to the vector element indictor display, following is a vector element

ement Value {	VctA <sub>1</sub>	0.	can view other eler     at next page.
			the vector element

### **Edit Vector Elements**

Following procedures show you how to add or subtract vectors:

Operation	Display (Upper)	Display (Lower)
Shift VCTR 1 1 (Create Vector A)	VctA(m) m?	0.
2 = (Vector A dimension is 2)	VctA <sub>1</sub>	0.
9 = 5 = (Input Element)	VctA <sub>1</sub>	9.
Shift VCTR 1 2 (Create Vector B)		
2 =	VctB <sub>1</sub>	0.
7 = 3 = (Input Element)	VctB <sub>1</sub>	7.
ON/C Shift VCTR 3 1 - Shift VCTR		
3 2	VctA - VctB	0.
=	VctAns <sub>1</sub>	2.
<b>→</b>	VctAns <sub>2</sub>	2.
		•

! An error occurs if you try to add or subtract vectors whose dimensions are different from each other. For example Vector A (a,b,c) cannot add or subtract with Vector B (d,e).

53

editing and the corresponding vector element indicator will be

43

2. Input the new value and press  $\blacksquare$  to confirm the edit.

## Vector Addition and Subtraction

3 (Create Vector C) VctC(m) m? Example: Vector A = (9,5), Vector B = (7,3), Vector A – Vector B =? 4=5=(-)6=(Input Element) VctC ON/C 5 × Shift VCTR 3 3

## Calculate the Inner Product of Two Vectors two vectors.

**Example:** Calculate the inner product of Vector A and Vector B. As Vector A = (4,5,-6) and Vector B = (-7,8,9), and the both vectors are already created in the calculator.

54

Operation	Display (Upper)	Display (Lower)
VCTR 3 1 (Recall		
<b>(</b> )	VctA	0.
<b>→</b>	Dot	1
	VctA ■	0.
3 2	VctA ■ VctB	0.
tA • VctB)	VctA • VctB	-42.

Standard Deviation ■ Press ot o ender SD mode.

■ Before starting, be sure to clear the statistical memory by pressing shift at 1 = . ■ You can recall the following statistical value after input all the

Value	Symbol	Operation	
e of Sum	$\Sigma x^2$	Shift s-sum 1	
ation of x	Σχ	Shift S-SUM 2	
er of data sample	n	Shift s-sum 3	
of x	x	Shift S-VAR 1	
ation Standard Deviation of x	χσn	Shift S-VAR 2	
e Standard Deviation of x	Xσn-1	Shift S-VAR 3	
le: To calculate $\Sigma x^2, \Sigma x,  n,  \overline{x},  x  \sigma_n$ , and $x  \sigma_{n-1}$ of data: 75, 85, 90, 77, 77 in SD mode.			

Operation Display (Upper) Display (Lower)

Operation	Dishlay (Ohhei)	Display (Lower)
Shift CLR 1 (select Scl, clear Stat. memory)	Stat clear	0.
75 Data 85 Data 90 Data 77 Shift ; 2 Data	n =	5.
Shift s-sum 1 =	$\Sigma x^2$	32,808.
Shift s-sum 2 =	Σχ	404.
Shift s-sum 3 =	n	5.
Shift S-VAR 1 =	x	80.8
Shift S-VAR 2 =	Xσn	5.741080038
Shift S-VAR 3 =	Xσn-1	6.418722614

## options will be shown

Lin Log Exp →

		_	_		
	1	2	3		
Press (	1), 2 or 🤅	for the	correspo	nding reg	ressior
[Lin] = Linear	regression				
[Log] = Logarii	thmic regress	ion			

[Exp] = Exponential regression

Operation	Display (Upper)	Display (Lower)
MODE 1		0.
Alpha A Alpha = (1 a M 3		
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	A=(1_3) π B <sup>2</sup> C	0.
Shift Solve	A?	0.
▼	B?	0.
5 = (radius is B = 5cm)	C?	0.
20 = (height is C = 20cm)	C?	20.
**	A?	0.
Shift Solve	A =	523,5987756
(Calculate with new variables)	A?	523.5987756
200 (volume is A = 200 cm <sup>3</sup> )	B?	5.
2 = (radius is B = 2 cm)	C?	20.
Shift Solve	C =	47.74648293

the Solve calculation, the calculator will transform the solution as When the expression cannot be solved, [Solve ERROR] will be

! If the expression does not have the equal sign ( = ) and perform

■ CALC function is deemed to be a memory zone with maximum 79

■ Beware that CALC function can only be used in COMP mode or

steps for you to store a single calculation expression which will be

CALC Function

recalled and calculated a number of times by different values So, you can replace the variable "V" by A, variable "r" by "B", and ■ After input the calculation expression and pressed (CALC), the calculator will request for the current value of your input variables. If the radius is 5cm, cone height is 20cm, calculate the cone volume

And if the cone volume is 200cm<sup>3</sup>, with radius 2cm, calculate the

STATISTICAL CALCULATIONS [SD] [REG]

■ To enter the standard deviation mode by pressing one of one of

■ Before starting, be sure to clear the statistic memory by pressing

In REG mode, store the x-data and y-data in the form of:

x-data y-data Data, pressing Data Data will input the same

mode, the data 20 has 8 times will press 20 hift : 8 Data

value (x) and data frequency (Freq). Follow with the above

To edit the stored data, input the new value during the display

of that data value (x) after pressing ↑ or ↓ key, and then press

to confirm the edit. But, if you press □ instead of □,a

new data value will be stored.

Press Alpha Co can delete the data during the display of that

the data which following the deleted data will be shifted up automatically.

Press ( key to exit the data value and frequency display, then

[Data Full] will be displayed and you cannot input or perform

any of the data you had input.

· After changing into another mode or regression type (Lin, Log

Exp, Pwr, Inv, Quad), input data will be cleared.

After finishing data entries, you can recall or calculate the

Quadratic equation : ax2 + bx + c = 0 (a second-order polynomia

Cubic equation :  $ax^3 + bx^2 + cx + d = 0$  (an equation with cubic

You can solve any calculation expression as per your needs in

Example: A cone of height "h" and base is a circular with radius "r",

the volume of the cone will be in the formula

 $V = \frac{1}{3}\pi r^2 h$   $A = \frac{1}{3}\pi B^2 C$ 

Obtain the Scalar Product of a Vector

Example: To Multiply Vector C = (4,5,-6) by 5

Operation

 $s \times VctA(a h) = VctB(axs hxs)$ 

a vector of the same size.

vector with the fixed multiple.

Each position in the vector is multiplied by a single value, resulting in

Following procedures show you how to obtain the scalar product of a

5 x VctC

Display (Upper) Display (Lower)

COMP mode. Simply input the expression with different variables and press the siles key.

**Example:** Solve the cubic equation  $5x^3 + 2x^2 - 2x + 1 = 0$ 

equation in a single variable x)

← Degree?

Display (Upper) Display (Lower

0.331662479

- 0.331662479

any calculation. Press owc or = key will display the options

you can perform other calculation operations.

[EditOFF] or [ESC]

Press 1):

statistical values.

**Quadratic or Cubic Equations** 

Operation

5=2=(-)2=1=

(Cubic equation)

Solve Function

data value (x) after ↑ or ↓ key is pressed; and the sequence of

Input data are stored in calculation memory. As the memory full,

Keep on inputting data without storing into the

memory, and you are not able to display or edit

Just exit data input without registering the data

Each time you press Data to register the input, the number of

data input up to that point is indicated on the display once (n =

the number of input data).

Press ↑ or ↓ key during or after data input can display the data

example, press **↓** will display [x1 = 20], and press **↓** will display

data twice.

• Use \_\_\_\_\_\_ for same data multiple entries. For example in SD

will input the same data twice.

In SD mode, store the displayed data by pressing Data, pressing

Perform the data input (Precautions!).

# Calculate the Outer Product of Two Vectors

45

Example: Calculate the outer product of Vector A and Vector B. As

vectors are already created in the calculator. Operation Shift VCTR 3 1 (Reca √ctA x VctB (VctA x VctB) /ctAns₁

! An error occurs if you try to obtain an inner or outer product of two Determine the Absolute value of a Vector

Following procedures show you how to determine the absolute value (size) of a vector: **Example:** To determine the absolute value of the Vector C. As Vector C = (4,5,-6) and already created in the calculator.

Abs Shift VCTR 3 3 Abs VctC Abs VctC 8.774964387 Example: Base on Vector A=(-1, -2, 0) and Vector B=(1, 0, -1) determine the size of the angle (angle unit: Deg) and the size 1 vector perpendicular to both A and B.  $\cos \theta = \frac{(A \cdot B)}{|A||B|}$ , whereas  $\theta = \cos^{-1} \frac{(A \cdot B)}{|A||B|}$ 

Size 1 vector perpendicular to both A and B=  $\frac{A \times B}{|A \times B|}$ 

55

Result: \(\frac{VctA \times VctB}{|VctA \times VctB|} = (0.666666666, -0.333333333, 0.6666666666)

Display (Upper) Display (Lower)

Vector A = (4,5,-6) and Vector B = (-7,8,9), and the both = 0 = (-)1 = (Input Elements) VctB<sub>1</sub> Shift VCTR 3 1 Shift VCTR →1 Shift VCTR Display (Upper) | Display (Lower VctA - VctB Shift Abs Shift VCTR 3 1 Shift Abs Shift VCTR 3 2 ) = (calculate VctA | VctB | )  $\begin{array}{c|c}
\text{Shift} & \cos^{-1}(A \cdot B) \\
\hline
& \text{Ans} & \text{(calculate = } \cos^{-1}\frac{(A \cdot B)}{|A||B|})
\end{array}$ Shift VCTR 3 4 ÷ Ans =

### **ADVICE AND PRECAUTIONS** ■ This calculator contains precision components such as LSI

chips and should not be used in place subject to rapid variations in temperature, excessive humidity dirt or dust, or exposed to direct sunlight. ■ The liquid crystal display panel is made of glass and should

not be subjected to excessive pressure. ■ When cleaning the device do not use a damp cloth or a volatile liquid such as paint thinner. Instead, use only a soft, ■ Do not under any circumstances dismantle this device. If you

believe that the calculator is not functioning properly, either bring or mail the device together with the guarantee to the service representative of a Canon business office.

56

# 136

■ Press On to enter COMP mode for integration calculation.

/dx integration expression , a , b , n )

"a" and "b" defining the integration range of the definite integral.
"n" is the number of partitions (equivalent to N = 2").

 $\int_{a}^{b} f(x) dx$ , n = 2<sup>n</sup>, 1 ≤ n ≤ 9, n ≠ 0

As the number of significant digits is increased, internal integration

cases, even after considerable time is spent for performing a

when significant digits are less than 1, an ERROR might be

! The number of partitions (n) have to specify in the range of 1 to 9 integer, any value that out of the setup division range (N=2 $^n$ , n  $\neq$ 0,

You can skip the number of partitions entirely and the calculator

The smaller the value of n is, the shorter the calculation time is, but

the result is comparatively less accurate; on the other hand, the bigger the n is, the longer the calculation time is, and the result is

When performing integration calculation with trigonometric

Logab, i~Rand, Rec ( and Pol ( functions can't join to integration

During the busy calculation, the calculator will display the message

47

When the display characters are dim even a darker LCD contrast

2. Remove the screw which securely fix the battery cover in place.

Remove the old battery with a ball pen or similar sharp object.

5. Load the new battery with the positive "+" side facing up.

6. Replace the battery cover, screw, and press the reset buttor

had been adjusted, replace the lithium battery by the following

function, select radian (Rad) as the angle unit setting.

BATTERY REPLACEMENT

Press off to power off the calculator.

to initialize the calculator.

Solide the battery cover slightly and lift it.

will automatically assign an appropriate value on behalf of you.

n=1~9 integer), [Arg ERROR] will be displayed.

calculation, the calculation results may be erroneous. Particularly

Display (Upper) Display (Lower)

To perform an integration calculation you are required to input

· The integration expression has variable x.

**Example:** Perform the integration calculation for

Operation

5 Alpha — X 1 4 (+ 3 Al

X 2 + 2 Alpha X +

2 7 3 7 4 7 =

[PROCESSING].

procedures:

 $\int_0^3 (5x^4 + 3x^2 + 2x + 1) dx$ , with n = 4.

 $\hfill \blacksquare$  The integration calculation is based on Simpson's rule.

141

The Linear regression formula is in relation to two variables

the linear regression (regression coefficient A, regression

investment, and the investment unit at 180% yield.

Example: By the following investment and yield table, calculate

vestment (thousand unit) Yield (%)

coefficient B) of capital investment verse yield, the correlation

ession estimated value

nmation of all x<sup>3</sup> values

nation of all x2y pairs

nation of all x<sup>4</sup> values

gression estimated value x

egression estimated value x

Regression estimated value v

Linear regression

v = A + Bx

ssion coefficient

Shift s-var → → 3

Shift S-VAR ->-

Shift S-VAR → → → 2

 $1.00 \times 10^{-3}$  Shift s-sum  $\rightarrow 1$ 

Shift s-sum → → 3

Shift S-VAR → → 3

Shift S-VAR → → → 1

Shift s-var → → → 2

Shift s-var → → → 3

 $\Sigma x^2 v$  Shift s-sum  $\Rightarrow \Rightarrow 2$ 

CLR 1 (Clear Stat. memor

, 120 Data 30 , 126 Data 40 ,

Data 50 136 Data 60 141 Data

AR → → 2 (=) (Coefficient B)

S-VAR -> 3 = (Correlation Coefficien

The quadratic regression is in relation to the formula

**Example:** ABC company investigated the effectiveness of the

advertisement expenses in coded units, the following data were

Advertisement expenses: x | Effectiveness: y (%)

Please calculate the correlation coefficient; use the regression to

advertisement expenses x = 30, and estimate the advertisement expenses level (estimate the value of x) for the effectiveness

■ Enter the matrix mode by pressing MODE MODE 1, and [MATX]

matrix or maximum three matrices which named A, B, and C at

■ Before you start matrix calculations, you have to create one

■ The matrix calculation results are stored into MatAns memory

automatically. You can use the matrix MatAns memory for any subsequent matrix calculations.

■ Matrix calculation may use up to two levels matrix stack; however,

Create a Matrix

1. Press Shiff Matx (Dim) to specify the matrix name (A, B or C),

and then specify the dimension (number of rows and number columns) of the matrix. The dimension of matrix can be up to

2. Next, input the value (element) of the matrix according to the

2 rows and 3 columns

3. Use the cursor keys to move, view or edit the matrix elements.

4. When finished the input, press  $\overline{\text{ovc}}$  to exit the matrix creation

Press Shift MATX 2 (Edit), then specify the matrix A, B or C for editing and the corresponding matrix element indicator will be

2. Input the new value and press = to confirm the edit.

3. When finished the input, press owc to exit the matrix editing

48

product backside)

: Approx. 7 minutes

158 (L) x 84 (W) x 18 (H) mm (with case)

This symbol indicates that this product is not to be

law. This product should be handed over to a

disposed of with your household waste, according to the WEEE Directive (2002/96/EC) and your national

designated collection point, e.g., on an authorized

one-for-one basis when you buy a new similar product or to an authorized collection site for recycling waste

electrical and electronic equipment (EEE). Improper

handling of this type of waste could have a possible

egative impact on the environment and human

health due to potentially hazardous substances that

are generally associated with EEE. At the same time

your cooperation in the correct disposal of this produc

resources. For more information about where you car

drop off your waste equipment for recycling, please

WEEE scheme or your household waste disposal

service. For more information regarding return and

58

recycling of WEEE products, please visit

(EEA: Norway, Iceland and Liechtenstein)

www.canon-europe.com/environment.

contact your local city office, waste authority, approved

will contribute to the effective usage of natural

6-7/64" (L) x 3-5/32" (W) x 37/64" (H) (body)

6-7/32" (L) x 3-5/16" (W) x 23/32" (H) (with case)

display of flashing cursor

: Single lithium battery (Please refer to the

: Approximately 6,000 hours continuous

matrix element indictor display, following is a matrix element

squaring a matrix, cubing a matrix, or inverting a matrix only use

estimate the effectiveness (estimate the value of v) if the

ift s-var → → 1 = (Coefficient A)

 $= A + Bx + Cx^2$ 

Matrix Calculations

indicator lights up.

Mat A23

**Edit Matrix Elements** 

SPECIFICATIONS

Power Consumption: D.C. 3.0V / 6mW

Usable Temperature: 0 ~ 40°C (32F ~ 104F

Size : 155 (L) x 80 (W) x 14.5 (H) mm (body)

135 g (4.8 oz) (include cover)

European Union (and EEA) only.

Specifications are subject to change without notice

Power Supply

Battery Life

Auto Power Off

Weight: 100 g (3.5 oz)

**Example:** For the equation  $Y = 5x^2 - 2x + 1$ , calculate the value of Y if Integration Calculations

Operation	Display (Upper)	Display (Lower)
Alpha Y Alpha = 5 Alpha X X²		
_ 2 Alpha _ x + 1	$Y = 5x^2 - 2x + 1$	0.
CALC	X?	0.
5 =	Y = 5x <sup>2</sup> –2x +1	116.
CALC 7 =	Y = 5x <sup>2</sup> –2x +1	232.

If follow with or → another regression options will be displayed

You can press 1, 2 or 3 for the corresponding regression

Before starting, be sure to clear the statistical memory by pressing

Symbol Operation

 $\Sigma y^2$ 

 $x\sigma_n$ 

 $x\sigma_{n-1}$ 

 $y\sigma_{n\text{-}1}$ 

Shift s-sum 2

Shift s-sum 3

Shift s-suM →

Shift s-sum → 2

Shift S-VAR 1

Shift S-VAR 2

Shift S-VAR 3

Shift S-VAR

Shift S-VAR -> 2

Shift 5-VAR → 3

Shift S-VAR → → 1

Shift S-VAR → →

Σxy Shift s-sum → 3

■ Input data in the form of x-data y-data Data. Use hift in for

same data multiple entries.

Press (C) can delete the data during the display of data

You can recall and use the following regression results:

← Pwr Inv Quad

[Pwr] = Power regression [Inv] = Inverse regression

[Quad] = Quadratic regression

value after ↑ or ↓ key is pressed.

Value

mation of all x2 value

Number of data sample

ummation of all y2 values

mmation of all y value:

ummation of all xv pairs

opulation Standard Deviation of

opulation Standard Deviation of

Sample Standard Deviation of v

Sample Standard Deviation of x

Mean of the x values

Mean of the y values

Regression coefficient

calculation, change into another mode, or turn off the calculato Differential Calculations

■ Press <sup>MODE</sup> 1 to enter COMP mode for differential calculation.

The differential expression must contain the variable x.

To perform a differential calculation, you have to input the expression Shift didx differential expression j a j \( \Delta x \)

the function  $f(x) = \sin(3x + 30)$ .

"a" is the differential coefficient.

 "△x" is the change interval of x (calculation precision) **Example:** To determine the derivative at point x = 10,  $\triangle x = 10^{-8}$ , fo

Operation	Display (Upper)	Display (Lower)	
Shift ddx sin ( 3 Alpha X +			
30 ) , 10 , 1 EXP (-) 8			
	d/dx ( sin ( 3x	0.026179938	

calculator will automatically substitute a value for  $\triangle x$ . The smaller the entered value  $\triangle x$  is, the longer the calculation time will be and the result is more accurate; the bigger the entered value  $\triangle x$  is, the shorter the calculation time will be and the result

will be comparatively less accurate.

Discontinuous points and extreme changes in the value of x can cause inaccurate results or errors.

When performing differential calculation with trigonometric function, select radian (Rad) as the angle unit setting. ! Logab, i~Rand, Rec ( and Pol ( functions can't join to differential

During the busy calculation, the calculator will display the message [PROCESSING]

Display (Upper) Display (Low 3 = (Create Vector A) VctA ) 2 = 0 (=) (Input Elements) VctA<sub>1</sub> 3 = (Create Vector B) | VctB

### Calculate VctA x VctB =) Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instruction.

■ Electromagnetic interference or electrostatic discharge may cause the display to malfunction or the contents of the memory to be lost or altered. Should this occur, use the tip of a ball point pen (or similar sharp object) to press the [RESET] occur, use the tip of a ball point pen (or button on the back of the calculator. How To Reset

### ■ Keep the battery out of reach of children. If the battery is swallowed, contact a doctor immediately. ■ Misuse of battery may cause leakage, explosion, damages

or dispose by incineration.

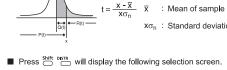
or personal injury. ■ Don't recharge or disassemble the battery, it could cause a short circuit. ■ Never expose the battery to high temperatures, direct heat

57

, 40 (Data) 19 , 38 (Data) i-VAR → → 1 = (Coefficient A) AR → → 2 (=) (Coefficient B) i-VAR → → 3 = (Coefficient C) ft s-var  $\rightarrow \rightarrow \rightarrow 3 \equiv (\hat{y} \text{ when } x = 30)$  30  $\hat{y}$  48.69615715 Shift s-var  $\rightarrow \rightarrow \rightarrow 2 \equiv (Yield \%)$  45  $\hat{y}$ 30 Shift S-VAR → → → 1 (Investment unit) 180 x Shift S-VAR → → → 1 =  $(\hat{x}_1 \text{ when y} = 50)$  50  $\hat{x}_1$  31.30538226 Shift S-VAR → → → 2 =  $(\hat{x}_2 \text{ when y} = 50)$  50  $\hat{x}_2$  -167.1096731 Logarithmic, Exponential, Power, and Inverse Regression Formulas • Loarithmic Regression : y = A + Blnx

### Distribution Calculations • Exponential Regression : y = Ae<sup>Bx</sup> (Iny = InA + Bx)

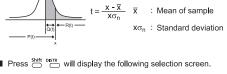
• Power Regression :  $y = Ax^B (Iny = InA + BInx)$ Regression (REG) mode, you can perform the normal distribution Invere Regression : y = A+Bx -**Quadratic Regression** 



0.688165819

### ■ After sample data are entered in either Statistic (SD) or

or probability distribution calculation such as P(t), Q(t) and R(t) ir which t is the variate of the probabilistic experimer



P( Q( R(  $\rightarrow$  t

1 2 3 4

[1 2 3] [9 8 7]

**Example:** *MatA* = | 4 5 6 |, *MatB* = | 6 5 4 |, MatA x MatB=?

[7 8 9] [3 2 1]

MatA x

! Matrices which will be added, subtracted or multiplied must be ir

matrices whose dimensions are different from each other. For

the same size. An error occurs if you try to add, subtract or multiply

49

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59

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CANON COMMUNICATION & IMAGE FRANCE S.A.\_

CANON OF CHILD STATE OF THE STATE OF T

MatA x MatB

Matrix A 3

3 (Matrix A 3 x 3)

1=2=3=4=5=6

ft MATX 1 2 (Matrix B 3 x 3)

9=8=7=6=5=

= 3 = 2 = 1 = (Input Elen

→ (press left, right, up or do

y to display the result)

3(=)3(=)

= 7 = 8 = 9 = (Input Element) MatA

Display (Upper) Display (Lowe

You can press 1, 2, 3 or 4 for the corresponding

(t): Probability below ven point x

x : Random variable

(t): Probability below ven point x and abov t) = 0.5 - R(t)R(t): Probability above a R(t) = 1 - P(t)Example: Calculate the probability distribution P(t) for the sample data: 20, 43, 26, 46, 20, 43, 26, 19, 23, 20 when x = 26.

Operation	Display (Upper)	Display (Lower)
MODE MODE 1 1 (Lin Regression)		0.
Shift CLR 1 =	Stat clear	0.
20 Data 43 Data 26 Data 46 Data 20 Data		
43 Data 26 Data 19 Data 23 Data 20 Data	n =	10.
26 Shift DISTR 4 =	26 <b>→</b> t	-0.250603137
Shift DISTR 1 (-) 0 • 25 ) =	P(-0.25)	0.40129

Matrix Addition, Subtraction and Multiplication Obtain the Scalar Product of a Matrix

> Operation (Matrix C 2x2)

3=(-)2=(-)1=5= 2 × Shift MATX 3 3 2 x MatC 7 (2 x MatC) Obtain the Determinant of a Matrix

Following procedures show you how to obtain the determinant of a

<Result: -471>

Shift MATX 1 3 (Dim) 3 =			
3 = (Matrix C 3x3)	MatC <sub>11</sub>	(	
10=(-)5=3=(-)4			
<b>■</b> 9 <b>■</b> 2 <b>■</b> 1 <b>■</b> 7 <b>■</b>			
(-) 3 = (Input Element)	MatC <sub>11</sub>	10	
ON/C Shift MATX →	Det Trn	1 2	
1 Shift MATX 3 3 (DetMatC)	Det MatC	(	
	Det MatC	-471	
An error occurs if you obtain the determinant of a non-square			

50

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CANON (SCHWEIZ) AG

**Example:** Multiple Matrix C =  $\begin{bmatrix} 3 & -2 \\ -1 & 5 \end{bmatrix}$  by 2 < Result:  $\begin{bmatrix} 6 & -4 \\ -2 & 10 \end{bmatrix}$ Display (Upper) Display (Lower)

Each position in the matrix is multiplied by a single value, resulting in

a matrix of the same size. Following procedures show you how to

**Example:** Obtain the determinant of Matrix  $C = \begin{vmatrix} -4 & 9 & 2 \end{vmatrix}$ 

Operation Display (Upper) Display (Lower)

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