Chapter 1

Basic Operation

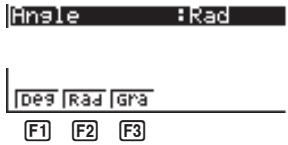
1-1 Before Starting Calculations...

Before performing a calculation for the first time, you should use the Set Up Screen to specify the angle unit and display format.

■ Setting the Angle Unit (Angle)

1. Display the Set Up Screen and use the ▲ and ▼ keys to highlight “Angle”.

F1 (Deg) ..... Specifies degrees as default.
F2 (Rad) ..... Specifies radians as default.
F3 (Gra) ..... Specifies grads as default.



2. Press the function key that corresponds to the angle unit you want to use.

- The relationship between degrees, grads, and radians is shown below.

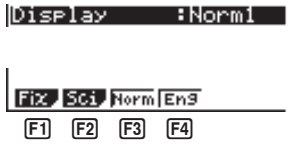
  360° = 2π radians = 400 grads

  90° = π/2 radians = 100 grads

■ Setting the Display Format (Display)

1. Display the Set Up Screen and use the ▲ and ▼ keys to highlight “Display”.

F1 (Fix) ..... Displays screen for specification of number of decimal places.
F2 (Sci) ..... Displays screen for specification of number of significant digits.
F3 (Norm) ..... Switches exponential format display range.
F4 (Eng) ..... Displays calculation results using engineering notation.



2. Press the function key that corresponds to the display format you want to use.

● To specify the number of decimal places (Fix)

Example **To specify two decimal places.**

F1 (Fix)

F3 (2)

Press the function key that corresponds to the number of decimal places you want to specify (n = 0 ~ 9).

- Displayed values are rounded off to the number of decimal places you specify.

● To specify the number of significant digits (Sci)

Example **To specify three significant digits.**

F2 (Sci)

F4 (3)

Press the function key that corresponds to the number of significant digits you want to specify (n = 0 ~ 9).

- Displayed values are rounded off to the number of significant digits you specify.
- Specifying 0 makes the number of significant digits 10.

● To specify the exponential display range (Norm 1/Norm 2)

Press F3 (Norm) to switch between Norm 1 and Norm 2.

Norm 1: 10^{-2} (0.01)>|x|, |x| ≧10^{10}

Norm 2: 10^{-9} (0.000000001)>|x|, |x| ≧10^{10}

● To specify the engineering notation display (Eng)

Press F4 (Eng) to switch between engineering notation and standard notation. The indicator "/E" is on the display while engineering notation is in effect.

The following are the 11 engineering notation symbols used by this calculator.

Symbol	Meaning	Unit
E	Exa	10^{18}
P	Peta	10^{15}
T	Tera	10^{12}
G	Giga	10^{9}
M	Mega	10^{6}
k	kilo	10^{3}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}

- The engineering symbol that makes the mantissa a value from 1 to 1000 is automatically selected by the calculator when engineering notation is in effect.

■ Inputting Calculations

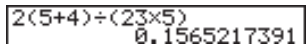
When you are ready to input a calculation, first press [AC] to clear the display. Next, input your calculation formulas exactly as they are written, from left to right, and press [EXE] to obtain the result.

Example 1 **2 + 3 – 4 + 10 =**

[AC] [2] [+] [3] [−] [4] [+] [1] [0] [EXE]

Example 2 **2(5 + 4) ÷ (23 × 5) =**

[AC] [2] [(] [5] [+] [4] [)] [÷]
[(] [2] [3] [×] [5] [)] [EXE]



■ Calculation Priority Sequence

This calculator employs true algebraic logic to calculate the parts of a formula in the following order:

① Coordinate transformation

Pol (*x*, *y*), Rec (*r*, *θ*)

Differentials, quadratic differentials, integrations, Σ calculations

d/dx, d^2/dx^2, $\int dx$, Σ, Mat, Solve, FMin, FMax, List→Mat, Fill, Seq, SortA, SortD, Min, Max, Median, Mean, Augment, Mat→List, List

② Type A functions

With these functions, the value is entered and then the function key is pressed.

x^2, x^{-1}, $x!$, ° ' ", ENG symbols

③ Power/root

^(x^y), $\sqrt[x]{\ }$

④ Fractions

$a\,^b/_c$

⑤ Abbreviated multiplication format in front of π, memory name, or variable name.

2π, 5A, X min, F Start, etc.

⑥ Type B functions

With these functions, the function key is pressed and then the value is entered.

$\sqrt{\ }$, $\sqrt[3]{\ }$, log, ln, e^x, 10^x, sin, cos, tan, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, sinh, cosh, tanh, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$, (–), parenthesis, d, h, b, o, Neg, Not, Det, Trn, Dim, Identity, Sum, Prod, Cuml, Percent

⑦ Abbreviated multiplication format in front of Type B functions

$2\sqrt{3}$, A log2, etc.

⑧ Permutation, combination

*n*P*r*, *n*C*r*

⑨ ×, ÷

⑩ +, –

⑪ Relational operator
=, ≠, >, <, ≥, ≤

⑫ And, and

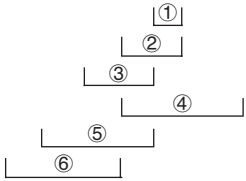
⑬ Or, or, xor, xnor

- When functions with the same priority are used in series, execution is performed from right to left.

  $e^x \ln \sqrt{120} \rightarrow e^x\{\ln(\sqrt{120})\}$

  Otherwise, execution is from left to right.
- Anything contained within parentheses receives highest priority.

Example **2 + 3 × (log sin2π² + 6.8) = 22.07101691 (angle unit = Rad)**



■ Multiplication Operations without a Multiplication Sign

You can omit the multiplication sign (×) in any of the following operations.

- Before the Type B functions

Example **2sin30, 10log1.2, $2\sqrt{3}$, 2Pol(5, 12), etc.**

- Before constants, variable names, memory

Example **2π, 2AB, 3Ans, $3Y_1$, etc.**

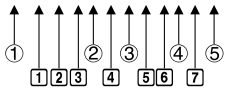
- Before an open parenthesis

Example **3(5 + 6), (A + 1)(B – 1), etc.**

■ Stacks

The unit employs memory blocks, called *stacks*, for storage of low priority values and commands. There is a 10-level *numeric value stack*, a 26-level *command stack*, and a 10-level *program subroutine stack*. If you execute a formula so complex it exceeds the amount of stack space available, an error message appears on the display (Stk ERROR during calculations or Ne ERROR during execution of a program subroutine).

Example 2 × ((3 + 4 × (5 + 4) ÷ 3) ÷ 5) + 8 =



Numeric Value Stack

①	2
②	3
③	4
④	5
⑤	4
⋮	

Command Stack

1	×
2	(
3	(
4	+
5	×
6	(
7	+
⋮	

- Calculations are performed according to the priority sequence. Once a calculation is executed, it is cleared from the stack.
- Storing a complex number takes up two numeric value stack levels.
- Storing a two-byte function takes up two command stack levels.

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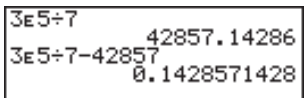
■ Input, Output and Operation Limitations

The allowable range for both input and output values is 10 digits for the mantissa and 2 digits for the exponent. Internally, however, the unit performs calculations using 15 digits for the mantissa and 2 digits for the exponent.

Example $3 \times 10^5 \div 7 - 42857 =$

AC 3 EXP 5 ÷ 7 EXE
3 EXP 5 ÷ 7 −
4 2 8 5 7 EXE



■ Overflow and Errors

Exceeding a specified input or calculation range, or attempting an illegal input causes an error message to appear on the display. Further operation of the calculator is impossible while an error message is displayed. The following events cause an error message to appear on the display.

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- When any result, whether intermediate or final, or any value in memory exceeds $\pm 9.999999999 \times 10^{99}$ (Ma ERROR).
- When an attempt is made to perform a function calculation that exceeds the input range (Ma ERROR).
- When an illegal operation is attempted during statistical calculations (Ma ERROR). For example, attempting to obtain 1VAR without data input.
- When the capacity of the numeric value stack or command stack is exceeded (Stk ERROR). For example, entering 25 successive (followed by 2 + 3 × 4 EXE.
- When an attempt is made to perform a calculation using an illegal formula (Syn ERROR). For example, 5 × × 3 EXE.
- When you try to perform a calculation that causes memory capacity to be exceeded (Mem ERROR).
- When you use a command that requires an argument, without providing a valid argument (Arg ERROR).
- When an attempt is made to use an illegal dimension during matrix calculations (Dim ERROR).

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- Other errors can occur during program execution. Most of the calculator's keys are inoperative while an error message is displayed. You can resume operation using one of the two following procedures.
- Press the AC key to clear the error and return to normal operation.

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- Press ◀ or ▶ to display the error.

■ Memory Capacity

Each time you press a key, either one byte or two bytes is used. Some of the functions that require one byte are: 1, 2, 3, sin, cos, tan, log, ln, $\sqrt{\ }$, and π. Some of the functions that take up two bytes are d/dx(, Mat, Xmin, If, For, Return, DrawGraph, SortA(, PxlOn, Sum, and a_{n+1}.

When the number of bytes remaining drops to five or below, the cursor automatically changes from " _ " to " ▮ ". If you still need to input more, you should divide your calculation into two or more parts.

- As you input numeric values or commands, they appear flush left on the display. Calculation results, on the other hand, are displayed flush right.

■ Graphic Display and Text Display

The unit uses both a graphic display and a text display. The graphic display is used for graphics, while the text display is used for calculations and instructions. The contents of each type of display are stored in independent memory areas.

●To switch between the graphic display and text display

Press [SHIFT] [F6] (G↔T). You should also note that the key operations used to clear each type of display are different.

●To clear the graphic display

Press [SHIFT] [F4] (Sketch) [F1] (Cls) [EXE].

●To clear the text display

Press [AC].

■ Editing Calculations

Use the [◀] and [▶] keys to move the cursor to the position you want to change, and then perform one of the operations described below. After you edit the calculation, you can execute it by pressing [EXE], or use [▶] to move to the end of the calculation and input more.

●To change a step

Example **To change cos60 to sin60**

[cos] [6] [0]	cos 60_
[◀] [◀] [◀]	cos 60
[sin]	sin 60

●To delete a step

Example **To change 369 × × 2 to 369 × 2**

[3] [6] [9] [×] [×] [2]	369××2_
[◀] [◀] [DEL]	369×2

●To insert a step

Example **To change 2.36^2 to $\sin 2.36^2$**

[2] [•] [3] [6] [x^2]

[◀] [◀] [◀] [◀] [◀]

[SHIFT] [INS]

[sin]

- When you press [SHIFT] [INS] a space is indicated by the symbol "[ ]". The next function or value you input is inserted at the location of "[ ]". To abort the insert operation without inputting anything, move the cursor, press [SHIFT] [INS] again, or press [◀], [▶] or [EXE].

1-2 Memory

■ Variables

This calculator comes with 28 variables as standard. You can use variables to store values to be used inside of calculations. Variables are identified by single-letter names, which are made up of the 26 letters of the alphabet, plus *r* and *θ*. The maximum size of values that you can assign to variables is 15 digits for the mantissa and 2 digits for the exponent. Variable contents are retained even when you switch power off.

●To assign a value to a variable

Example **To assign 123 to variable A**

AC 1 2 3 → ALPHA A EXE

Example **To add 456 to variable A and store the result in variable B**

AC ALPHA A + 4 5 6 → ALPHA B EXE

●To display the contents of a variable

Example **To display the contents of variable A**

AC ALPHA A EXE

●To clear a variable

Example **To clear variable A**

AC 0 → ALPHA A EXE

- To clear all variables, select “Memory Usage” from the **MEM** Mode.

●To assign the same value to more than one variable

[value] → [first variable name] ALPHA F3 (~)
[last variable name] EXE

- You cannot use “*r*” or “*θ*” as a variable name in the above operation.

Example **To assign a value of 10 to variables A through F**

AC 1 0 → SHIFT ALPHA A
F3(~) F EXE

```
10→A~F
                10
```

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■ Function Memory

Function memory is convenient for temporary storage of often-used expressions. For longer term storage, we recommend that you use the GRAPH Mode for expressions and the PRGM Mode for programs.

●To display the Function Memory Menu

OPTN F6(▷)F6(▷)F3(FMEM)

```
STO RCL fn SEE
F1  F2  F3  F4
```

F1(STO) ..... Stores functions
F2(RCL) ..... Recalls functions
F3(f*n*) ..... Specifies input as a function.
F4(SEE) ..... Displays a list of stored functions

●To store a function

Example **To store the function (A+B) (A–B) as function memory number 1.**

OPTN F6(▷)F6(▷)F3(FMEM) AC
(ALPHA A + ALPHA B)
(ALPHA A − ALPHA B)

```
(A+B)(A-B)_
```

```
STO RCL fn SEE
```

F1

F1(STO)

```
f1 f2 f3 f4 f5 f6
```

F1

F1(f_1)

```
== Function Memory ==
f1:(A+B)(A-B)
```

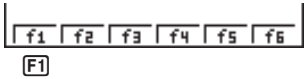
- If the function memory number you assign a function to already contains a function, the previous function is replaced with the new one.

●To recall a function

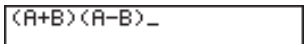
Example **To recall the contents of function memory number 1**

[OPTN] [F6](▷)[F6](▷)[F3](FMEM)[AC]

[F2](RCL)



[F1](f1)



- The recalled function appears at the current location of the cursor on the display.

●To display a list of available functions

[OPTN] [F6](▷)[F6](▷)[F3](FMEM)

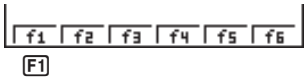
[F4](SEE)

●To delete a function

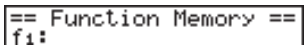
Example **To delete the contents of function memory number 1**

[OPTN] [F6](▷)[F6](▷)[F3](FMEM)[AC]

[F1](STO)



[F1](f1)



- Executing the store operation while the display is blank deletes the function in the function memory you specify.

●To use stored functions

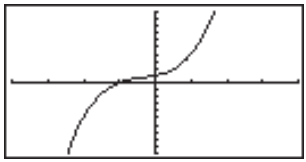
Once you store a function in memory, you can recall it and use it for a calculation. This feature is very useful for quick and easy input of functions when programming or graphing.

Example **To store $x^3 + 1$, $x^2 + x$ into function memory, and then graph: $y = x^3 + x^2 + x + 1$**

Use the following View Window parameters.

Xmin	**= –4**	**Ymin**	**= –10**
Xmax	**= 4**	**Ymax**	**= 10**
Xscale	**= 1**	**Yscale**	**= 1**

[SHIFT] [SETUP] [▼] [F1] (Y=) [EXIT]
[OPTN] [F6] (▷) [F6] (▷) [F3] (FMEM)
[AC] [X,θ,T] [^] [3] [+] [1]
[F1] (STO) [F1] (f_1) (stores ($x^3 + 1$))
[AC] [X,θ,T] [x^2] [+] [X,θ,T]
[F1] (STO) [F2] (f_2) (stores ($x^2 + x$))
[AC] [SHIFT] [F4] (Sketch) [F1] (Cls) [EXE]
[SHIFT] [F4] (Sketch) [F5] (GRPH) [F1] (Y=)
[OPTN] [F6] (▷) [F6] (▷) [F3] (FMEM)
[F3] (f_n) [F1] (f_1) [+] [F2] (f_2) [EXE]



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• For full details about graphing, see “8. Graphing”.

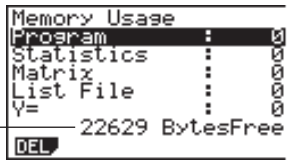
■ Memory Status (MEM)

You can check how much memory is used for storage for each type of data. You can also see how many bytes of memory are still available for storage.

●To check the memory status

1. In the Main Menu, select the **MEM** icon and press [EXE].

2. Press [EXE] again to display the memory status screen.



Number of bytes still free

3. Use ▲ and ▼ to move the highlighting and view the amount of memory (in bytes) used for storage of each type of data.

The following table shows all of the data types that appear on the memory status screen.

Data Type	Meaning
Program	Program data
Statistics	Statistical calculations and graphs
Matrix	Matrix memory data
List File	List data
Y=	Graph functions
Draw Memory	Graph drawing conditions (View Window, enlargement/reduction factor, graph screen)
Graph Memory	Graph memory data
View Window	View Window memory data
Picture	Graph screen data
Dynamic Graph	Dynamic Graph data
Table	Function Table & Graph data
Recursion	Recursion Table & Graph data
Equation	Equation calculation data
Alpha Memory	Alpha memory data
Function Mem	Function memory data

■ Clearing Memory Contents

You have a choice of two differenct procedures that you can use to clear memory contents.

- Clearing specific data within a selected data type
- Clearing all data within a specific data type

●To clear specific data within a selected data type

1. In the memory status screen, use ▲ and ▼ to move the highlighting to the data type you want to clear.

2. Press [F1] (DEL). If you selected a data type that contains multiple memory areas, a function menu like the one shown below appears to let you specify which memory you want to clear.

** This menu appears when you select List File.*

3. Press the function key that corresponds to the data you want to clear.

4. Press [F1] (YES) to clear the data or [F6] (NO) to abort the operation without clearing anything.

●To clear all data within a specific data type

1. In the memory status screen, use ▲ and ▼ to move the highlighting to the data type whose data you want to clear.

2. Press [F1] (DEL). The following confirmation menu appears if you selected a data type in which all data can be cleared by a single operation.

3. Press [F1] (YES) to clear the data or [F6] (NO) to abort the operation without clearing anything.

1-3 Option (OPTN) Menu

The option menu gives you access to scientific functions and features that are not marked on the calculator's keyboard. The contents of the option menu differ according to the mode you are in when you press the [OPTN] key.

●Option Menu in the RUN and PRGM Modes

[OPTN]

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[F1] (LIST) ..... List function menu

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[F2] (MAT) ..... Matrix operation menu

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[F3] (CPLX) ..... Complex number calculation menu

[F4] (CALC) ..... Functional analysis menu

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[F5] (STAT) ..... Paired-variable statistical estimated value menu

[F6] (▷) ..... Next menu

[F6] (▷)

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[F2] (HYP) ..... Hyperbolic calculation menu

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[F3] (PROB) .... Probability/distribution calculation menu

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[F4] (NUM) ..... Numeric calculation menu

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[F5] (ANGL) ..... Menu for angle/coordinate conversion, sexagesimal input/conversion

[F6] (▷) ..... Next menu

[F6] (▷)

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[F1] (ESYM) .... Engineering symbol menu

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[F2] (PICT) ..... Graph save/recall menu

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[F3] (FMEM) .... Function memory menu

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[F4] (LOGIC) ... Logic operator menu

[F6] (▷) ..... Previous menu

Note that the [OPTN] key is disabled while binary, octal, decimal, or hexadecimal is set as the default number system.

●Option Menu during numeric data input in the STAT, MAT, LIST, TABLE, RECUR and EQUA Modes

[OPTN]

[F6](▷)

The meanings of the option menu items are described in the sections that cover each mode.

●Option Menu during formula input in the GRAPH, DYNA, TABLE and RECUR Modes

[OPTN]

[F6](▷)

The meanings of the option menu items are described in the sections that cover each mode.

1-4 Variable Data (VARS) Menu

You can use the variable data menu to recall the data listed below.

- View Window values
- Enlargement/reduction factor
- Single-variable/paired-variable statistical data
- Graph functions
- Dynamic Graph set up data
- Table & Graph table range and table contents
- Recursion formula, table range, and table contents
- Equation coefficients and solutions

The variable data menu does not appear if you press [VARS] while binary, octal, decimal, or hexadecimal is set as the default number system.

To recall variable data, press [VARS] to display the variable data menu.

[VARS]

[F1] (V-WIN) .... View Window values
[F2] (FACT) ..... *x* and *y*-axis enlargement/reduction factor
[F3] (STAT) ..... Single/paired-variable statistical data
[F4] (GRPH) .... Graph functions stored in the GRAPH Mode
[F5] (DYNA) .... Dynamic Graph set up data
[F6] (▷) ..... Next menu

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[F6] (▷)

[F1] (TABL) ..... Table & Graph function table range and table contents
[F2] (RECR) .... Recursion formula table range and table contents
[F3] (EQUA) .... Solutions and coefficients of linear equations with two through six unknowns, quadratic equations, and cubic equations
[F6] (▷) ..... Previous menu

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- Note that the EQUA item appears for function key [F3] only when you access the variable data menu from the **RUN** or **PRGM** Mode.

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●To recall View Window values

Pressing F1 (V-WIN) while the variable data menu is on the screen displays a View Window value menu.

F1 (V-WIN)

F1 (X) ..... *x*-axis menu
F2 (Y) ..... *y*-axis menu
F3 (T,*θ*) ..... T,*θ* menu
F4 (R-X) ..... *x*-axis menu for Dual Graph right hand screen
F5 (R-Y) ..... *y*-axis menu for Dual Graph right hand screen
F6 (R-T,*θ*) ..... T,*θ* menu for Dual Graph right hand screen

The following menu appears whenever you press F1 (X), F2 (Y), F4 (R-X), or F5 (R-Y) while the View Window value menu is on the display.

F1 (min)..... Minimum
F2 (max)..... Maximum
F3 (scal)..... Scale

The following menu appears whenever you press F3 (T,*θ*) or F6 (R-T,*θ*) while the view window value menu is on the display.

F1 (min)..... Minimum
F2 (max)..... Maximum
F3 (ptch)..... Pitch

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●To recall enlargement and reduction factors

Pressing F2 (FACT) while the variable data menu is on the screen displays an enlargement/reduction factor menu.

F2 (FACT)

F1 (Xfct) ..... *x*-axis enlargement/reduction factor
F2 (Yfct) ..... *y*-axis enlargement/reduction factor

●To recall single/paired-variable statistical data

Pressing F3 (STAT) while the variable data menu is on the screen displays a statistical data menu.

F3 (STAT)

F1 (X) ..... Single/paired-variable *x*-data menu
F2 (Y) ..... Paired-variable *y*-data menu
F3 (GRPH) .... Statistical graph data menu
F4 (PTS) ..... Summary point data menu

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The following menu appears whenever you press F1 (X), while the statistical data menu is on the display.

F1 (X)

F1 (n) ..... Number of data
F2 ($\bar{x}$) ..... Mean of x data
F3 (Σx) ..... Sum of x data
F4 (Σx^2) ..... x data sum of squares
F5 ($x\sigma_n$) ..... x data population standard deviation
F6 (▷) ..... Next menu

F6 (▷)

F1 ($x\sigma_{n-1}$) ..... x data sample standard deviation
F2 (minX) ..... x data minimum value
F3 (maxX) ..... x data maximum value
F6 (▷) ..... Previous menu

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The following menu appears whenever you press F2 (Y) while the statistical data menu is on the display.

F2 (Y)

F1 ($\bar{y}$) ..... Mean of y data
F2 (Σy) ..... Sum of y data
F3 (Σy^2) ..... y data sum of squares
F4 (Σxy) ..... x data and y data sum of products
F5 ($y\sigma_n$) ..... y data population standard deviation
F6 (▷) ..... Next menu

F6 (▷)

F1 ($y\sigma_{n-1}$) ..... y data sample standard deviation

F2 (minY) ..... y data minimum value

F3 (maxY) ..... y data maximum value

F6 (▷) ..... Previous menu

The following menu appears whenever you press F3 (GRPH) while the statistical data menu is on the display.

F3 (GRPH)

F1 (a) - F5 (e) .. Statistical graph regression coefficient and multinomial coefficients

F6 (▷) ..... Next menu

F6 (▷)

F1 (r) ..... Statistical graph correlation coefficient

F2 (Q1) ..... First quartile

F3 (Med) ..... Median of input data

F4 (Q3) ..... Third quartile

F5 (Mod) ..... Mode of input data

F6 (▷) ..... Previous menu

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The following menu appears whenever you press F4 (PTS) while the statistical data menu is on the display.

F4 (PTS)

F1 ($x1$) ~ F6 ($y3$) .... Coordinates of summary points

●To recall graph functions

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Pressing F4 (GRPH) while the variable data menu is on the screen displays a graph function menu.

F4 (GRPH)

Input a storage area number and then press one of the following function keys to recall the corresponding graph function stored in that storage area.

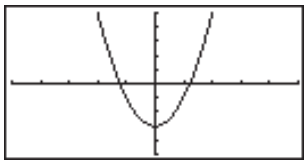
- [F1] (Y) ..... Rectangular coordinate or inequality function
- [F2] (*r*) ..... Polar coordinate function
- [F3] (Xt) ..... Parametric graph function Xt
- [F4] (Yt) ..... Parametric graph function Yt
- [F5] (X) ..... X=constant graph function

Example **To recall and draw the graph for the rectangular coordinate function $y = 2x^2 - 3$, which is stored in storage area Y2**

Use the following View Window parameters to draw the graph.

Xmin	**= –5**	**Ymin**	**= –5**
Xmax	**= 5**	**Ymax**	**= 5**
Xscale	**= 1**	**Yscale**	**= 1**

[SHIFT] [F4] (Sketch) [F5] (GRPH) [F1] (Y=)
[VARS] [F4] (GRPH) [F1] (Y) [2] [EXE]



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●To recall Dynamic Graph set up data

Pressing [F5] (DYNA) while the variable data menu is on the screen displays a Dynamic Graph set up menu.

[F5] (DYNA)

- [F1] (Strt) ..... Coefficient range start value
- [F2] (End) ..... Coefficient range end value
- [F3] (Pitch) ..... Coefficient value increment

●To recall Table & Graph table range and table content data

Pressing [F6] (▷) and then [F1] (TABL) while the variable data menu is on the screen displays a Table & Graph data menu.

[F6] (▷)[F1] (TABL)

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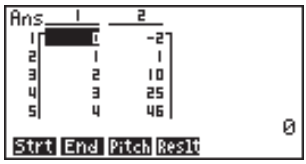
[F1] (Strt) ..... Table range start value (F Start command)
[F2] (End) ..... Table range end value (F End command)
[F3] (Pitch) ..... Table value increment (F pitch command)
[F4] (Reslt) ..... Matrix of table contents (F Result command)

- The Reslt item appears for function key [F4] only when the above menu is displayed in the **RUN** or **PRGM** Mode.

Example **To recall the contents of the numeric table for the function $y = 3x^2 - 2$, while the table range is Start=0 and End=6, and pitch=1**

[F4](Reslt)

[EXE]



●To recall recursion formula, table range and table content data

Pressing [F6] (▷) and then [F2] (RECR) while the variable data menu is on the screen displays a recursion data menu.

[F6] (▷)[F2] (RECR)

[F1] (FORM) .... Recursion formula data menu
[F2] (RANG) .... Table range data menu
[F3] (Reslt) ..... Matrix of table contents (R Result command)

To recall recursion formula data

The following menu appears whenever you press F1 (FORM) while the recursion data menu is on the display.

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F1 (FORM)

F1 (a_n) ..... a_n expression
F2 (a_{n+1}) ..... a_{n+1} expression
F3 (a_{n+2}) ..... a_{n+2} expression
F4 (b_n) ..... b_n expression
F5 (b_{n+1}) ..... b_{n+1} expression
F6 (b_{n+2}) ..... b_{n+2} expression

To recall table range data

The following menu appears whenever you press F2 (RANG) while the recursion data menu is on the display.

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F2 (RANG)

F1 (Strt) ..... Table range start value (F Start command)
F2 (End) ..... Table range end value (F End command)
F3 (a_0) ..... Zero term a_0 value
F4 (a_1) ..... First term a_1 value
F5 (a_2) ..... Second term a_2 value
F6 (▷) ..... Next menu

F6 (▷)

F1 (b_0) ..... Zero term b_0 value
F2 (b_1) ..... First term b_1 value
F3 (b_2) ..... Second term b_2 value
F4 (a_nSt) ..... Origin of a_n recursion formula convergence/divergence graph (WEB graph)
F5 (b_nSt) ..... Origin of b_n recursion formula convergence/divergence graph (WEB graph)
F6 (▷) ..... Previous menu

To recall matrix of table contents

Whenever you press F3 (Reslt) while the recursion data menu is on the display, the recursion formula numeric table appears on the screen in matrix format.

- This operation is available only from the **RUN** or **PRGM** Mode.

Example **To recall the contents of the numeric table for recursion formula $a_n = 2n + 1$, while the table range is Start=1 and End=6**

F3(Reslt)

EXE

- The table contents recalled by the above operation are stored automatically in Matrix Answer Memory (MatAns).
- An error (Dim ERROR) occurs if you perform the above operation when there is no function or recursion formula numeric table in memory.

●To recall equation coefficients and solutions

Pressing F6 (▷) and then F3 (EQUA) while the variable data menu is on the screen displays an equation data menu.

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F6(▷)F3(EQUA)

F1 F2 F3 F4

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F1 (S-Rlt) ..... Matrix of solutions for linear equations with two through six unknowns

F2 (S-Cof) ..... Matrix of coefficients for linear equations with two through six unknowns

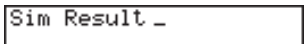
F3 (P-Rlt) ..... Matrix of solutions for a quadratic or cubic equation

F4 (P-Cof) ..... Matrix of coefficients for a quadratic or cubic equation

Example 1 **To recall the solutions for the following linear equations with two unknowns**

$2x + 3y = 8$
$3x + 5y = 14$

F1 (S-Rlt)

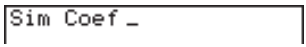


EXE

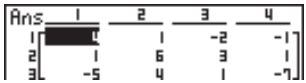
Example 2 **To recall the coefficients for the following linear equations with three unknowns**

$4x + y - 2z = -1$
$x + 6y + 3z = 1$
$-5x + 4y + z = -7$

F2 (S-Cof)



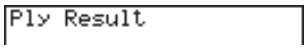
EXE



Example 3 **To recall the solutions for the following quadratic equation**

$2x^2 + x - 10 = 0$

F3 (P-Rlt)



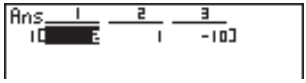
EXE

Example 4 **To recall the coefficients for the following quadratic equation**

$2x^2 + x - 10 = 0$

F4 (P-Cof)

EXE



- The coefficients and solutions recalled by the above operation are stored automatically in Matrix Answer Memory (MatAns).
- When the solutions for a linear equation with 2 through 6 unknowns contain complex numbers, only the real number parts are stored in Matrix Answer Memory (MatAns).
- Coefficient and solution memory data for a linear equation with 2 though 6 unknowns cannot be recalled at the same time.
- The following conditions cause an error (Mem ERROR) to be generated.

  When there are no coefficients input for the equation

  When there are no solutions obtained for the equation

1-5 Program (PRGM) Menu

To display the program menu, first enter the **RUN** or **PRGM** Mode from the Main Menu, and then press [SHIFT] [PRGM].

[SHIFT] [PRGM]

- [F1] (COM) ..... Program command menu
- [F2] (CTL) ..... Program control command menu
- [F3] (JUMP) ..... Jump command menu
- [F4] (?) ..... Input command
- [F5] (◢) ..... Output command
- [F6] (▷) ..... Next menu

[F6] (▷)

- [F1] (CLR) ..... Clear command menu
- [F2] (DISP) ..... Display command menu
- [F3] (REL) ..... Conditional jump relational operator menu
- [F4] (I/O) ..... Input/output control command menu
- [F5] (:) ..... Multistatement connector
- [F6] (▷) ..... Previous menu

The following function key menu appears if you press [SHIFT] [PRGM] in the RUN Mode or the PRGM Mode while binary, octal, decimal, or hexadecimal is set as the default number system.

[SHIFT] [PRGM]

The functions assigned to the function keys are the same as those in the Comp Mode.

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For details on the commands that are available in the various menus you can access from the program menu, see “19. Programming”.