SHARP®

EL-9450

GRAPHING CALCULATOR

Supplement

02CGK (TINSE0457THZZ)
PRINTED IN CHINA

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Precautions for handling batteries

- Fluid from a leaking battery accidentally entering an eye could result in serious injury. Should this occur, wash with clean water and immediately consult a doctor.
- Should fluid from a leaking battery come into contact with your skin or clothes, immediately wash with clean water.
- If the product is not to be used for some time, to avoid damage to the unit from leaking batteries, remove them and store in a safe place.
- Do not leave exhausted batteries inside the product.
- Do not fit partially used batteries, and be sure not to mix different batteries types.

Note of calculation accuracy

- In principle, the calculation error is ±1 of the last digit (in case of exponential display, the calculation error is ±1 of the last digit of the mantissa display.)
- The calculation error increases in continuous calculations due to accumulation of each calculation error (that is the same for a^b, $\sqrt[a]{b}$, n!, e^x, ln, etc., where continuous calculations are performed internally).
- Calculation errors will accumulate and become larger into the vicinity of inflection points and singular points of functions. (For example, calculation of sinh x or tanh x at $x = 0$.)

INTRODUCTION

Congratulations on purchasing the EL-9450 Graphing Calculator. The basic functions of the EL-9450 are the same as the EL-9400. See the enclosed EL-9400 operation manual for almost all the operations. This supplement describes about the features added from the EL-9400, such as fraction calculations (Manual Calculations), pie chart (Statistics), and int÷/remain functions (Manual Calculations). It also describes the feature updates, such as capability of a self-made Slide Show, random function, commands for programming. Read both the EL-9400 Operation Manual (where EL-9400 and CE-LK1 should be read as EL-9450 and CE-LK1P respectively) and this supplement before operation.
Please store both the manual and the supplement in a convenient location for your reference.

THE NEW KEYS FOR EL-9450

CLIP Key

FRAC key

INT ÷ key

ab/c key
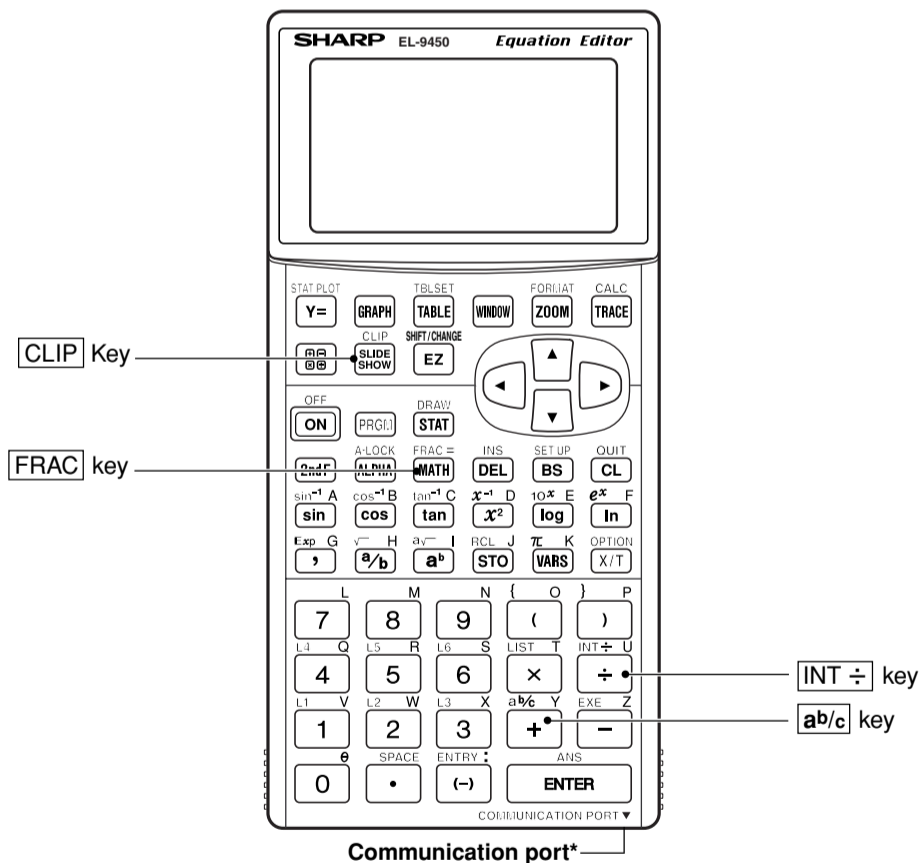
Communication port*
* Communication between EL-9450 and EL-9400 is not possible. Use CE-LK1P and PC to transfer the data from the EL9400.

NEW FEATURES
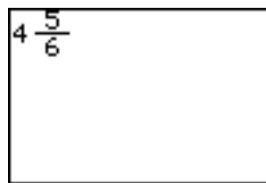
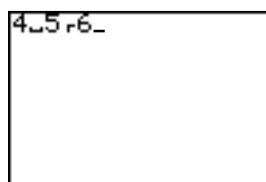## Fraction Calculation Features

[ab/c]   Enters a mixed number.

<Example>

- Enter $4\frac{5}{6}$

4 [2ndF] [ab/c] 5 [►] 6

Note: When no value is entered prior to this key, the number areas will be left blank. If the calculator is set to one-line mode, [2ndF] [ab/c] enters "⌴" (integer-fraction separator) only. Use [2ndF] [ab/c] in combination with [a/b] as follows.

- Enter $4\frac{5}{6}$ in one-line mode.

4 [2ndF] [ab/c] 5 [a/b] 6

* Integer part of the mixed number must be a natural number. A variable cannot be used. Using parenthesis in an equation, such as (1+2) ⌴ 2 ⌐ 3 or (5) ⌴ 2 ⌐ 3, will cause syntax error.
* When a numerator or a denominator is negative, the calculation will cause error.

Automatic/Manual Simplification

In the mixed or fraction calculation, you can select the automatic (default) or manual simplification of a fraction.

To set to the manual simplification:
1. Press [2ndF] [SETUP].
2. Press [H] [2].
   * The answer of division will not simplify automatically. Use Simp feature of **FRAC** menu to simplify the fraction.

FRAC menu

[1 Simp] Simplifies a given fraction stored in the ANSWER memory. (when the SIMPLE mode is set to Manual and the ANSWER mode is set to Mixed or Improp in the SETUP menu.)
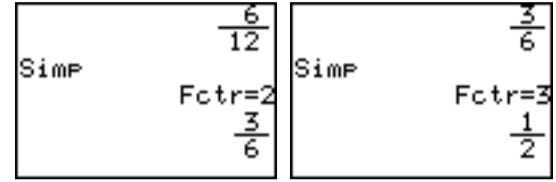
- **Specifying no common factor**
  Simplify the fraction using the lowest common factor other than 1.
  <Example>
  1 [a/b] 12 [►] [+] 5 [a/b] 12 [ENTER]
  [2ndF] [FRAC] [1] [ENTER] (Simplified by 2, the lowest common factor of 12 and 6.)
  [2ndF] [FRAC] [1] [ENTER] (Simplified by 3, the lowest common factor of 6 and 3.)


- **Specifying a common factor**
  Simplify the fraction using the specified common factor.
  <Example>
  1 [a/b] 12 [►] [+] 5 [a/b] 12 [ENTER]
  [2ndF] [FRAC] [1] 6 [ENTER] (Manually specify 6, the Greatest Common Factor of 12 and 6, to simplify the fraction.)
  Notes: • If the wrong number is specified for a common factor, an error will occur.
  • Calculation may take considerable amount of time if the factor is set to a large digit integer (6-digit or more, for example).
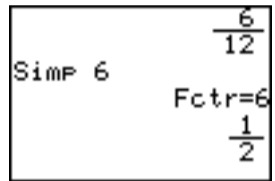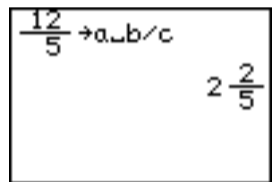

[2→a⌴b/c] Converts an improper fraction to a mixed number.
<Example>
- Change $\frac{12}{5}$ to a mixed number.
  12 [a/b] 5 [►] [2ndF] [FRAC] [2] [ENTER]
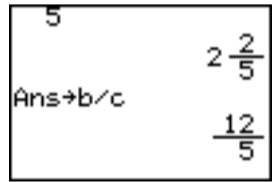

[3 →b/c] Converts a mixed number to an improper fraction.
<Example>
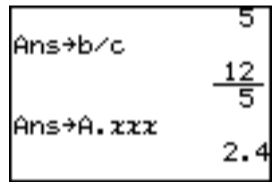- Change $2\frac{2}{5}$ to an improper fraction.
  [2ndF] [FRAC] [3] [ENTER]

[4→A.xxx] Converts a fraction to a decimal number.
<Example>
- Change $\frac{12}{5}$ to a decimal number.
  [2ndF] [FRAC] [4] [ENTER]

Integer Division
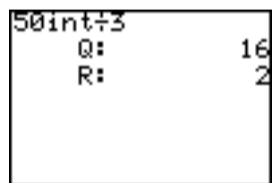
[INT ÷]   Performs an integer division, and returns a quotient and a remainder.
<Example>
- Get a quotient and a remainder of 50 ÷ 3.
  50 [2ndF] [INT ÷] 3 [ENTER]
* Quotient value is set to Ans and remainder is not stored.
* Calculation range: $0 \le x < 10^{10}$

B NUM submenu in MATH menus
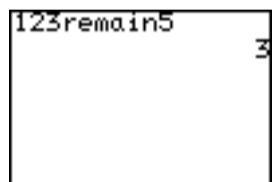
[0 remain] *natural number* remain *natural number*
Returns the remainder of a division.
<Example>
- Obtain the remainder when 123 is divided by 5.
 1 2 3 [MATH] [B] [0] 5 [ENTER]
* Calculation range: $0 \le x < 10^{10}$

New Feature for STATISTICS Menu

Pie Chart

Pie graph of sample (x)
- Maximum number of division is 8.
  * Calculation range: $0 \le x < 10^{100}$
- Data can be displayed in two modes:
  - Value display: 7 digits
  - Percentage display: Fixed decimal (2 digits decimal)
- Pie graphs are drawn in the same order as on the specifying list.
- Pie graphs cannot be displayed simultaneously with other graphs and X/Y axis, though lines or dots can be drawn. The coordinates of the free-moving cursor depend on the Window settings.
- The values are stored in variables A to H.
- As all the displayed values are rounded off in the percentage display mode, the total percentage may not be 100.
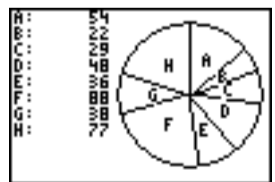
To set the graph format to a pie graph.
1. Press [2ndF] [STAT PLOT] [A] - [C] and [ENTER] and move the cursor to GRAPH.
2. Press [2ndF] [STAT PLOT] again.
3. Press [F] (PIE) and press [1] (Pie) or [2] (Pie %).
4. Press [GRAPH] to draw the graph.
   * Press [2ndF] [STAT PLOT] [E] [2] [ENTER] to select PlotOFF before entering to the next section.

Additional commands of programming for statistical data plotting

G S_PLOT menu (see page 163-164, Prgramming Commands)
[4 PlotON]   (Sets drawing of the specified statistical graph to on.)
[5 PlotOFF]   (Sets drawing of the specified statistical graph to off.)
   * If no number is specified, the above commands turn on/off all of the statistical graphs.

SLIDE SHOW FUNCTION

To enter the slide show screen, press [SLIDE SHOW].
The main menu of the slide show has the following classifications.

A B-IN .... Used to call up the built-in slide show screen.
B ORG ... Used to call up the original slide show screen.
C NEW ... Used to perform the default settings
(registration of name) for the original slide screen.
D EDIT ... Used to edit the original slide show.

```
AB-IN     ①Y=X²
BORG      ②Y=AX+B
CNEW      ③Y=√X
DEDIT     ④Y=1/X
          ⑤Y=sin X
          ⑥Y=tan X
```
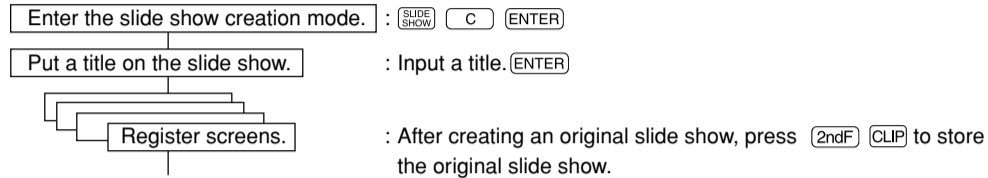Main menu   Sub-menu

1. Creating an Original Slide Show

The calculator provides a function which allows you to create your own slide show screens and register them.

- The number of screens which you can store may vary depending on the amount of free memory. (It is possible to register as many screens as the memory capacity allows. However, if you use up most of the memory for the slide show, this may affect other calculations.)
- A title can be put on the original slide show. (Only one title can be put on the slide show.)
- The flowchart for creating your original slide show is shown below.

```
Enter the slide show creation mode. : [SLIDE SHOW] [C] [ENTER]

Put a title on the slide show.        : Input a title. [ENTER]

      Register screens.               : After creating an original slide show, press [2ndF] [CLIP] to store
                                          the original slide show.
```

- The original slide show has no specific end mark. (When another slide show is created following the original slide show, the previous data is cleared and updated by the new slide show.)

<Example>
Input "Y1 = 2X–5" and "Y2 = X²", and then store the equations, graph screen, table screen, and graph and table screen in sequential order. (Set to the X-Y coordinate system.)

1. Press [☷] [CL].
2. Press [SLIDE SHOW] [C] [ENTER].
   Selects the original slide show (new slide show) creation mode.
3. Input the title as "GRAPH". (Up to 8 characters can be used for the title.)
   Press [ENTER].
4. Press [Y=] and enter "2X–5" to Y1 and "X²" to Y2.
5. Press [2ndF] [CLIP].
   The message, "STORE SCREEN:01", will appear instantaneously.
6. Press [GRAPH].
   Draws graphs for "Y1 = 2X – 5" and "Y2 = X²".
7. Press [2ndF] [CLIP].
   The message, "STORE SCREEN:02", will appear instantaneously.

```
TITLE:GRAPH
```

Repeat the above steps to register the necessary screens.
Subsequently, normal operations can be performed unless [2ndF] and [CLIP] are pressed.
If an original Slide Show has been already stored, the delete confirmation display appears after selecting [C NEW].
Press [ENTER] to delete the previous Slide Show file.
Press [2ndF] [QUIT] to cancel.

2. Viewing the Original Slide Show

To view the original slide show which was created previously, follow these steps.

```
AB-IN     GRAPH
BORG      4
CNEW      screens
DEDIT
          Press
          [ENTER]
```

1. Press [SLIDE SHOW] [B]. Sets the slide show to the view mode.
2. Press [ENTER]. (The symbol, "01" is highlighted in the upper right corner of the screen.)
3. Press [▼] or [▲] to navigate the screen.

3. Editing the Original Slide Show

The registered slide show data can be sorted, and deleted, and the title can be renamed in the edit mode.

```
AB-IN     ①MOVE
BORG      ②DEL
CNEW      ③RENAME
DEDIT
```

(1) Changing the order of the screens (MOVE)
1. Press [SLIDE SHOW] [D] [1].
2. Press [▼] or [▲] to call up the screen you wish to move and press [ENTER].
3. Press [▼] or [▲] to select the place you wish to move to and press [ENTER].
   * Exit this mode by pressing [2ndF] [QUIT].

(2) Deleting the registered screen (DEL)
To delete screen.
1. Press [SLIDE SHOW] [D] [2].
2. Press [▼] or [▲] to select the screen.
3. Press [ENTER] to delete.

Renaming the registered title (RENAME)
To change the title.
1. Press [SLIDE SHOW] [D] [3].
2. Input the new title.
3. Press [ENTER].

Additional Explanation for EL-9450 Menus

EL-9450 functions (P189)					
Major-category	Sub-category	Minor-category	Name	Description	Example of use
SETUP	H SIMPLE	1	Auto	Sets to the automatic simplification	Selection in the menu screen will fix the mode.
		2	Manual	Sets to the manual simplification	

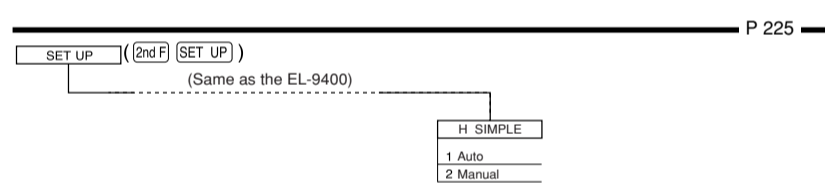| EL-9450 functions (P191)					
Major-category	Sub-category	Minor-category	Name	Description	Example of use
MATH	B NUM	0	remain	Calculate the remainder of integer division integer remain integer	natural number remain natural number

EL-9450 functions (P207)					
Major-category	Sub-category	Minor-category	Name	Description	Example of use
* PRGM COM	G S_PLOT	4	PlotON	Sets drawing of the specified statistical graph to on.	PlotON [number]
		5	PlotOFF	Sets drawing of the specified statistical graph to off.	PlotOFF [number]

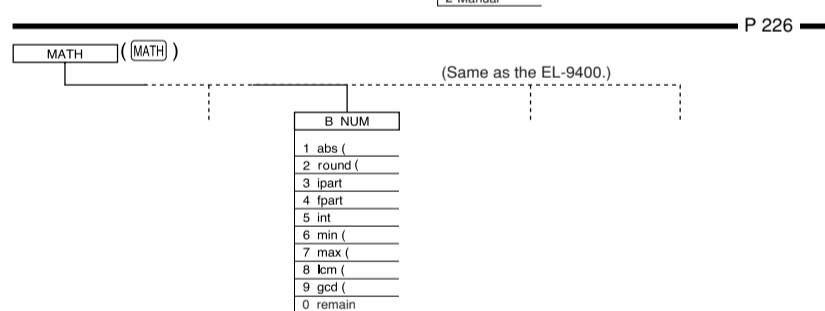| EL-9450 functions (P219-220)					
Major-category	Sub-category	Minor-category	Name	Description	Example of use
STAT GRAPH	E BOX	1	Box	Specifies box plot. The lines on either side are drawn the length of Q1-Xmin and Q3-Xmas	Box
		2	MBox•	Specifies modified box plot. The lines on either side is (Q3–Q1) x 1.5 Uses "•" to draw data points (including Xmin and Xmax) of the lines that are on the outside	MBox •
		3	MBox+	Specifies modified box plot. The lines on either side is (Q3–Q1) x 1.5 Uses "+" to draw data points (including Xmin and Xmax) of the lines that are on the outside	MBox +
		4	MBox□	Specifies modified box plot. The lines on either side is (Q3–Q1) x 1.5 Uses "□" to draw data points (including Xmin and Xmax) of the lines that are on the outside	MBox□

EL-9450 functions (P220)					
Major-category	Sub-category	Minor-category	Name	Description	Example of use
STAT GRAPH	F PIE	1	Pie	Draws a pie graph using entered values.	Pie
		2	Pie%	Draws a pie graph using the percentage	Pie%

EL-9450 functions (P223)					
Major-category	Sub-category	Minor-category	Name	Description	Example of use
SLIDE SHOW	B ORG			Displays the title and the number of screens of the currently editing Slide Show.	
	C NEW			Creates a new SLIDE SHOW file to store screen images.	
	D EDIT	1	MOVE	Move the pages.	
		2	DEL	Delete the pages	
		3	RENAME	Rename the title of the slide show.	

SETUP menu ━━━ P 225

```
[SET UP]  ( [2nd F] [SET UP] )
          (Same as the EL-9400)
                              H  SIMPLE
                              1 Auto
                              2 Manual
```

MATH menu ━━━ P 226

```
[MATH]  ( [MATH] )
          (Same as the EL-9400.)
              B  NUM
              1 abs (
              2 round (
              3 ipart
              4 fpart
              5 int
              6 min (
              7 max (
              8 lcm (
              9 gcd (
              0 remain
```

PRGM menu ━━━ P 229

```
[PROGM-COM]  ( [PRGM] on Program screen )
             (Same as the EL-9400)
                 G  S_PLOT
                 1 Plt1 (
                 2 Plt2 (
                 3 Plt3 (
                 4 Plot ON
                 5 Plot OFF
```

STAT GRAPH menu ━━━ P 232

```
[STAT GRAPH]  ( [2nd F] [STATPLOT] on PLOT 1-3 screen )
              (Same as the EL-9400)
                 E  BOX          F  PIE
                 1 Box           1 Pie
                 2 M Box •       2 Pie%
                 3 M Box+
                 4 M Box□
```

SLIDE SHOW menu ━━━ P 233

```
[SLIDE]  ( [SLIDE SHOW] )

   A  B–IN          B  ORG    C  NEW    D  EDIT
   1 Y=X²                               1 MOVE
   2 Y=AX+B                             2 DEL
   3 Y=√X                               3 RENAME
   4 Y=1/X
   5 Y=sinX
   6 Y=tanX
   7 Y=cos⁻¹X
   8 Y=lnX
```

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