fx-82EX
fx-85EX
fx-350EX
User's Guide

CASIO Worldwide Education Website

http://edu.casio.com

Be sure to keep all user documentation handy for future reference.

CASIO ®

CONTENTS

About this Manual

- Unless specifically stated, all sample operations in this manual assume that the calculator is in its initial default setup. Use the procedure under "Initializing the Calculator" to return the calculator to its initial default setup.
- The contents of this manual are subject to change without notice.
- The displays and illustrations (such as key markings) shown in this User's Guide are for illustrative purposes only, and may differ somewhat from the actual items they represent.
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Initializing the Calculator

Perform the following procedure when you want to initialize the calculator and return the calculation mode and setup (except for the Contrast setting) to their initial default settings. Note that this operation also clears all data currently in calculator memory.

[SHIFT] [9] (RESET) [3] (Initialize All) [=] (Yes)

Precautions

## Safety Precautions

> ⚠ **Battery**
>
> - Keep batteries out of the reach of small children.
> - Use only the type of battery specified for this calculator in this manual.

Handling Precautions

- Even if the calculator is operating normally, replace the battery at least once every three years (LR44), two years (R03 (UM-4)), or one year (LR03 (AM4)). A dead battery can leak, causing damage to and malfunction of the calculator. Never leave a dead battery in the calculator. Do not try using the calculator while the battery is completely dead (fx-85EX).
- The battery that comes with the calculator discharges slightly during shipment and storage. Because of this, it may require replacement sooner than the normal expected battery life.
- Avoid use and storage of the calculator in areas subjected to temperature extremes, and large amounts of humidity and dust.
- Do not subject the calculator to excessive impact, pressure, or bending.
- Never try to take the calculator apart.
- Use a soft, dry cloth to clean the exterior of the calculator.
- Whenever discarding the calculator or batteries, be sure to do so in accordance with the laws and regulations in your particular area.

Getting Started

Before using the calculator, slide its hard case downwards to remove it, and then affix the hard case to the back of the calculator as shown in the illustration nearby.
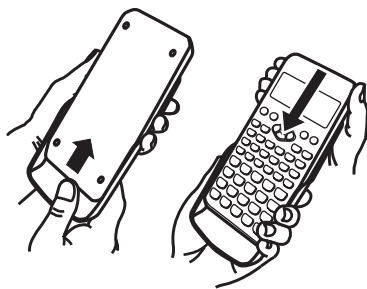
Turning Power On and Off

Press [ON] to turn on the calculator. Press [SHIFT] [AC] (OFF) to turn off the calculator.

Note: The calculator also will turn off automatically after approximately 10 minutes of non-use. Press the [ON] key to turn the calculator back on.

Adjusting Display Contrast

Display the Contrast screen by performing the key operation below:
[SHIFT] [MENU] (SETUP)⊙ [2] (Contrast). Next, use ⊙ and ⊙ to adjust contrast. After the setting is the way you want, press [AC].

Important: If adjusting display contrast does not improve display readability, it probably means that battery power is low. Replace the battery.

Key Markings

Pressing the [SHIFT] or [ALPHA] key followed by a second key (2) performs the alternate function of the second key. The alternate function is indicated by the text printed above the key.

(1) Keycap function (2) Alternate function

This color:	Means this:
Yellow	Press [SHIFT] and then the key to access the applicable function.
Red	Press [ALPHA] and then the key to input the applicable variable, constant, function, or symbol.

Reading the Display
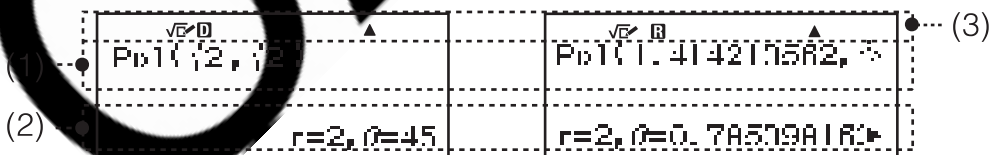
(1) Input expression (2) Calculation result (3) Indicators

- If a ▶ or ▷ indicator appears on the right side of either the input expression line or calculation result line, it means the displayed line continues to the right. Use ⊙ and ⊙ to scroll the line display. Note that if you want to scroll the input expression while both the ▶ and ▷ indicators are displayed, you will need to press [AC] first and then use ⊙ and ⊙ to scroll.
- The table below describes some of the typical indicators that appear at the top of the screen.

S	The keypad has been shifted by pressing the [SHIFT] key. The keypad will unshift and this indicator will disappear when you press a key.
A	The alpha input mode has been entered by pressing the [ALPHA] key. The alpha input mode will be exited and this indicator will disappear when you press a key.
D/**R**/**G**	Indicates the current setting of Angle Unit (**D**: Degree, **R**: Radian, or **G**: Gradian) on the setup menu.
FIX	A fixed number of decimal places is in effect.
SCI	A fixed number of significant digits is in effect.
M	There is a value stored in independent memory.
→x	The calculator is standing by for input of a variable name to assign a value to the variable. This indicator appears after you press [STO].
√□	Indicates that MathI/MathO or MathI/DecimalO is selected for Input/Output on the setup menu.
II	The display currently shows an intermediate result of a multi-statement calculation.
☀	This indicator is displayed while the calculator is being powered directly by its solar cells, either entirely or in some combination with the battery. (fx-85EX only)

Using Menus

Some of the operations of this calculator are performed using menus.
Menus are displayed by pressing [OPTN] or [SHIFT] and then [MENU](SETUP).
General menu operation operations are described below.
• You can select a menu item by pressing the number key that corresponds to the number to its left on the menu screen.

```
1:Input/Output       ⟵(1)     1:MathI/MathO     ⟵(2)
2:Angle Unit              [1]   2:MathI/DecimalO
3:Number Format        ⟶◀      3:LineI/LineO
4:Fraction Result               4:LineI/DecimalO
```
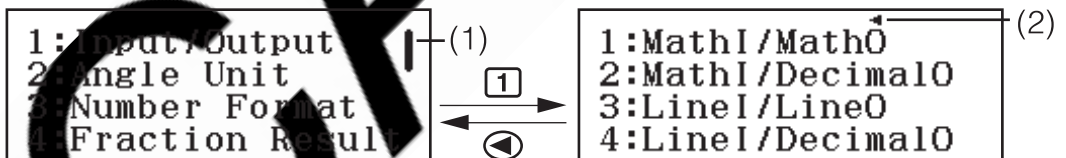
• A vertical scroll bar (1) indicates that the menu runs off the screen. In this case, you can use ▽ and △ to scroll the menu up and down. A left arrow (2) indicates that the currently displayed menu is a sub-menu. To return from a sub-menu to its parent menu, press ◀.
• To close a menu without selecting anything, press [AC].

Calculation Mode

Specify the calculation mode that is suitable for the type of calculation you want to perform.

1. Press [MENU] to display the Main Menu.
2. Use the cursor keys to move the highlighting to the icon you want.

```
[×÷/+−]₁  [ılıl]₂  [⊞]₃

1:Calculate
```
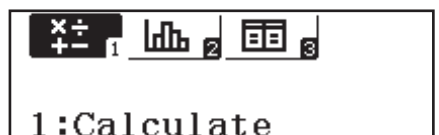
For this:	**Select this icon:**

General calculations	$\begin{array}{c} \times \div \\ + - \end{array}$	(Calculate)
Statistical and regression calculations	📊	(Statistics)
Generate a number table based on one or two functions	🔢	(Table)

3. Press $\equiv$ to display the initial screen of the mode whose icon you selected.

Note: The initial default calculation mode is the Calculate Mode.

Input and Output Formats

Before starting a calculation on the calculator, you should first use the operations in the table below to specify the formats that should be applied for calculation formula input and calculation result output.
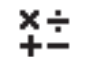
To specify this type of input and output:	Press SHIFT MENU (SETUP) 1 (Input/Output) and then press:
Input: Natural Textbook; Output: Format that includes a fraction, $\sqrt{\ }$, or π*1	1 (MathI/MathO)
Input: Natural Textbook; Output: Converted to decimal value	2 (MathI/DecimalO)
Input: Linear*2; Output: Decimal or fraction	3 (LineI/LineO)
Input: Linear*2; Output: Converted to decimal value	4 (LineI/DecimalO)

*1 Decimal output is applied when these formats cannot be output for some reason.
*2 All calculations, including fractions and functions are input in a single line. Same output format as that for models without Natural Textbook Display (S-V.P.A.M. models, etc.)

Input/Output Format Display Examples
MathI/MathO

$$\frac{4}{5}+\frac{2}{3}$$
$$\frac{22}{15}$$

$$\frac{1+\sqrt{2}}{\sqrt{2}}$$
$$\frac{2+\sqrt{2}}{2}$$

MathI/DecimalO

$$\frac{4}{5}+\frac{2}{3}$$
$$1.466666667$$

$$\frac{1+\sqrt{2}}{\sqrt{2}}$$
$$1.707106781$$

LineI/LineO

$$4\lrcorner5+2\lrcorner3$$
$$22\lrcorner15$$

$$(1+\sqrt{(2)})\div\sqrt{(2)}$$
$$1.707106781$$

LineI/DecimalO

$$4\lrcorner5+2\lrcorner3$$
$$1.466666667$$

$$(1+\sqrt{(2)})\div\sqrt{(2)}$$
$$1.707106781$$

Note: The initial default input/output format setting is MathI/MathO.

Configuring the Calculator Setup

To change the calculator setup
1. Press [SHIFT] [MENU] (SETUP) to display the setup menu.
2. Use ⊙ and ⊙ to scroll the setup menu, and then input the number displayed to the left of the item whose setting you want to change.

Items and Available Setting Options

"♦" indicates the initial default setting.

Input/Output [1]MathI/MathO♦; [2]MathI/DecimalO; [3]LineI/LineO; [4]LineI/DecimalO   Specifies the format to be used by the calculator for formula input and calculation result output.

Angle Unit [1]Degree♦; [2]Radian; [3]Gradian   Specifies degree, radian or gradian as the angle unit for value input and calculation result display.

Number Format   Specifies the number of digits for display of a calculation result.

[1]**Fix:** The value you specify (from 0 to 9) controls the number of decimal places for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.
Example: 100[÷]7[SHIFT][=](≈)*   14.286 (Fix 3)

[2]**Sci:** The value you specify (from 0 to 9) controls the number of significant digits for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.
Example: 1[÷]7[SHIFT][=](≈)*   1.4286 × 10⁻¹ (Sci 5)

[3]**Norm:** Displays calculation results in exponential format when they fall within the ranges below.
   [1]**Norm 1♦:** $10^{-2} > |x|, |x| \geqq 10^{10}$, [2]**Norm 2:** $10^{-9} > |x|, |x| \geqq 10^{10}$
Example: 1[÷]200[SHIFT][=](≈)* 5×10^{-3} (Norm 1), 0.005 (Norm 2)

* Pressing [SHIFT][=](≈) instead of [=] after inputting a calculation will display the calculation result in decimal form.

Fraction Result [1]ab/c; [2]d/c♦   Specifies either mixed fraction or improper fraction for display of fractions in calculation results.

Statistics [1]On; [2]Off♦   Specifies whether or not to display a Freq (frequency) column in the Statistics Mode Statistics Editor.

Table [1]$f(x)$; [2]$f(x),g(x)$♦   Specifies whether to use function $f(x)$ only or the two functions $f(x)$ and $g(x)$ in the Table Mode.

Decimal Mark [1]Dot♦; [2]Comma   Specifies whether to display a dot or a comma for the calculation result decimal mark. A dot is always displayed during input.
Note: When dot is selected as the decimal mark, the separator for multiple results is a comma (,). When comma is selected, the separator is a semicolon (;).

Digit Separator [1]On; [2]Off♦   Specifies whether or not a separator character should be used in calculation results.

MultiLine Font [1]Normal Font♦; [2]Small Font   Specifies the display font size when LineI/LineO or LineI/DecimalO is selected for Input/Output.

Up to four lines can be displayed while Normal Font is selected, and up to six lines can be displayed with Small Font.

To initialize calculator settings (except the Contrast setting)
[SHIFT] [9] (RESET) [1] (Setup Data) [=] (Yes)

Inputting Expressions and Values

Basic Input Rules

When you press [=] the priority sequence of the input calculation will be evaluated automatically and the result will appear on the display.

$4 \times \sin 30 \times (30 + 10 \times 3) = 120$

4 [×] [sin] 30 [)] [×] [(] 30 [+] 10 [×] 3 [)] [=]

*1

*2   *3

4×sin(30)×(30+10×
                                              120
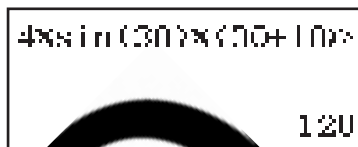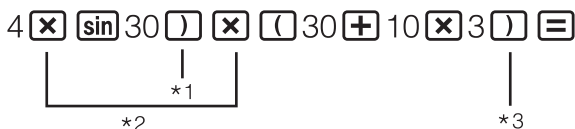
*1 Input of the closing parenthesis is required for sin and other functions that include parentheses.

*2 These multiplication symbols (×) can be omitted.

*3 The closing parenthesis immediately before the [=] operation can be omitted.

Note

• The cursor will change shape to ▮ when there are 10 bytes or less of allowed input remaining. If this happens, end calculation input and then press [=].

• If you execute a calculation that includes both division and multiplication operations in which a multiplication sign has been omitted, parentheses will be inserted automatically as shown in the examples below.
  - When a multiplication sign is omitted immediately before an open parenthesis or after a closed parenthesis.
    Example: $6 \div 2(1 + 2) \rightarrow 6 \div (2(1 + 2))$
  - When a multiplication sign is omitted immediately before a variable, a constant, etc.
    Example: $2 \div 2\sqrt{2} \rightarrow 2 \div (2\sqrt{2})$

Calculation Priority Sequence

The priority sequence of input calculations is evaluated in accordance with the rules below. When the priority of two expressions is the same, the calculation is performed from left to right.

1	Parenthetical expressions
2	Functions that have parentheses (sin(, log(, etc., functions that take an argument to the right, functions that require a closing parenthesis after the argument)
3	Functions that come after the input value (x^2, x^3, x^{-1}, $x!$, $°'''$, $°$, ^{r}, ^{g}, %), powers ($x^\blacksquare$), roots ($^\blacksquare\sqrt{\Box}$)
4	Fractions
5	Negative sign ((-))
6	Statistics Mode estimated values ($\hat{x}$, $\hat{y}$, $\hat{x}_1$, $\hat{x}_2$)
7	Multiplication where the multiplication sign is omitted

8	Permutation (nPr), combination (nCr)
9	Multiplication ($\times$), division ($\div$)
10	Addition ($+$), subtraction ($-$)

Note: When squaring a negative value (such as -2), the value being squared must be enclosed in parentheses ($\boxed{(}$ $\boxed{(-)}$2$\boxed{)}$ $\boxed{x^2}$ $\boxed{=}$). Since x^2 has a higher priority than the negative sign, inputting $\boxed{(-)}$2$\boxed{x^2}$ $\boxed{=}$ would result in the squaring of 2 and then appending a negative sign to the result. Always keep the priority sequence in mind, and enclose negative values in parentheses when required.

Inputting an Expression Using Natural Textbook Format (MathI/MathO or MathI/DecimalO Only)

Formulas and expressions that include fractions and/or special functions such as $\sqrt{}$ can be input in natural textbook format by using templates that appear when certain keys are pressed.

Example: $3\frac{1}{2} + 5\frac{3}{2}$

1. Press $\boxed{\text{SHIFT}}$ $\boxed{\text{目}}$ ($\blacksquare\frac{\square}{\square}$).
   - This inputs a mixed fraction template.

2. Input values into the integer, numerator, and denominator areas of the template.

   3$\blacktriangleright$1$\blacktriangleright$2

3. Do the same to input the remainder of the expression.

   $\blacktriangleright$ $\boxed{+}$ $\boxed{\text{SHIFT}}$ $\boxed{\text{目}}$ ($\blacksquare\frac{\square}{\square}$) 5$\blacktriangleright$3$\blacktriangleright$2$\boxed{=}$
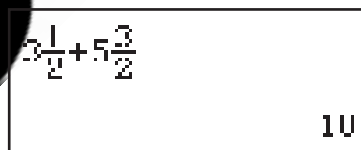
Tip: While the input cursor is located within the input area of a template (mixed fractions), pressing $\boxed{\text{SHIFT}}$ $\blacktriangleright$ jumps to the position immediately following (to the right) of the template, while pressing $\boxed{\text{SHIFT}}$ $\blacktriangleleft$ jumps to the position immediate before (to the left of) it.

$3\frac{1}{2}$ $\longrightarrow$ $\boxed{\text{SHIFT}}$ $\blacktriangleleft$ $\longrightarrow$ $|3\frac{1}{2}$

Note
- When you press $\boxed{=}$ and obtain a calculation result, part of the expression you input may be cut off. If you need to view the entire input expression again, press $\boxed{\text{AC}}$ and then use $\blacktriangleleft$ and $\blacktriangleright$ to scroll the input expression.
- Nesting of functions and parentheses is allowed. Further input will become impossible if you nest too many functions and/or parentheses.

To undo operations (MathI/MathO or MathI/DecimalO only): To undo the last key operation, press $\boxed{\text{ALPHA}}$ $\boxed{\text{DEL}}$ (UNDO). To redo a key operation you have just undone, press $\boxed{\text{ALPHA}}$ $\boxed{\text{DEL}}$ (UNDO) again.

Using Values and Expressions as Arguments (MathI/MathO or MathI/DecimalO only)

Example: To input $1 + \frac{7}{6}$ and then change it to $1 + \sqrt{\frac{7}{6}}$

$$1 \boxplus 7 \boxminus 6 \blacktriangleleft \blacktriangleleft \blacktriangleleft \blacktriangleleft \; \text{SHIFT} \; \text{DEL}\,(\text{INS})$$

$1+\dfrac{7}{6}$

$\sqrt{\blacksquare}$	$1+\sqrt{\dfrac{7}{6}}$

Pressing SHIFT DEL (INS) in the above example causes $\dfrac{7}{6}$ to be the argument of the function input by the next key operation ($\sqrt{}$).

Overwrite Input Mode (LineI/LineO or LineI/DecimalO only)

In the overwrite mode, text you input replaces the text at the current cursor location. You can toggle between the insert and overwrite modes by performing the operations: SHIFT DEL (INS). The cursor appears as "I" in the insert mode and as "▬" in the overwrite mode.

Toggling Calculation Results

While MathI/MathO or MathI/DecimalO is selected for Input/Output on the setup menu, each press of S⇔D will toggle the currently displayed calculation result between its fraction form and decimal form, its $\sqrt{}$ form and decimal form, or its π form and decimal form.

$$\pi \div 6 = \frac{1}{6}\pi = 0.5235987756 \; (\text{MathI/MathO})$$

$$\text{SHIFT} \; \text{x10}^x \,(\pi) \boxdiv 6 \boxminus \qquad \tfrac{1}{6}\pi \quad \leftarrow \text{S⇔D} \rightarrow \quad 0.5235987756$$

$$(\sqrt{2}+2) \times \sqrt{3} = 5.913591358 = \sqrt{6}+2\sqrt{3} \; (\text{MathI/DecimalO})$$

$$\boxed{(} \; \sqrt{\blacksquare} 2 \blacktriangleright \boxplus 2 \boxed{)} \boxed{\times} \sqrt{\blacksquare} 3 \boxminus \quad 5.913591358 \quad \leftarrow \text{S⇔D} \rightarrow \quad \sqrt{6}+2\sqrt{3}$$

Regardless of what is selected for Input/Output on the setup menu, each press of S⇔D will toggle the currently displayed calculation result between its decimal form and fraction form.

Important
- With certain calculation results, pressing the S⇔D key will not convert the displayed value.
- You cannot switch from decimal form to mixed fraction form if the total number of digits used in the mixed fraction (including integer, numerator, denominator, and separator symbol) is greater than 10.

To obtain a decimal value calculation result while MathI/MathO or LineI/LineO is selected

Press SHIFT = (≈) instead of = after inputting a calculation.

Basic Calculations

Fraction Calculations

Note that the input method for fractions depends on the current Input/Output setting on the setup menu.

$\dfrac{2}{3} + 1\dfrac{1}{2} = \dfrac{13}{6}$ (MathI/MathO)	$2\boxminus 3 \blacktriangleright \boxplus \text{SHIFT} \boxminus (\blacksquare\text{-}\tfrac{\square}{\square})$ $1 \blacktriangleright 1 \blacktriangledown 2 \boxminus$	$\dfrac{13}{6}$
(LineI/LineO)	$2\boxminus 3 \boxplus 1 \boxminus 1 \boxminus 2 \boxminus$	$13 \lrcorner 6$

Note
- Mixing fractions and decimal values in a calculation while something other than MathI/MathO is selected will cause the result to be displayed as a decimal value.
- Fractions in calculation results are displayed after being reduced to their lowest terms.
- To switch a calculation result between improper fraction and mixed fraction form, press [SHIFT] [S⇔D] ($a\frac{b}{c}$⇔$\frac{d}{c}$).

Percent Calculations

Inputting a value and pressing [SHIFT] [Ans] (%) causes the input value to become a percent.

$150 \times 20\% = 30$	150 [×] 20 [SHIFT] [Ans] (%) [=]	30
Calculate what percentage of 880 is 660. (75%)		
	660 [÷] 880 [SHIFT] [Ans] (%) [=]	75
Discount 3500 by 25%. (2625)		
	3500 [−] 3500 [×] 25 [SHIFT] [Ans] (%) [=]	2625

Degree, Minute, Second (Sexagesimal) Calculations

The syntax below is for inputting a sexagesimal value: {degrees} [°’”] {minutes} [°’”] {seconds} [°’”]. Note that you must always input something for the degrees and minutes, even if they are zero.

2°20'30" + 9'30" = 2°30'00"		
	2 [°’”] 20 [°’”] 30 [°’”] [+] 0 [°’”] 9 [°’”] 30 [°’”] [=]	2°30'0"
Convert 2°30'0" to its decimal equivalent.	[°’”]	2.5
(Converts decimal to sexagesimal.)	[°’”]	2°30'0"

Multi-Statements

You can use the colon character (:) to connect two or more expressions and execute them in sequence from left to right when you press [=].

$3 + 3 : 3 \times 3$	3 [+] 3 [ALPHA] [x^3] (:) 3 [×] 3 [=]	6
	[=]	9

Note: Inputting a colon (:) while LineI/LineO or LineI/DecimalO is selected for the Input/Output setting on the setup menu causes a newline operation to be performed.

Using Engineering Notation

Transform the value 1234 to engineering notation, shifting the decimal mark to the right, and then to the left.	1234 [=]	1234
	[ENG]	1.234×10^3
	[ENG]	1234×10^0
	[SHIFT] [ENG] (←)	1.234×10^3
	[SHIFT] [ENG] (←)	0.001234×10^6

Prime Factorization

In the Calculate Mode, a positive integer no more than 10 digits long can be factored to prime factors.

To perform prime factorization on 1014		
	1014 [=]	1014
	[SHIFT] [°’”] (FACT)	$2 \times 3 \times 13^2$

To re-display the unfactored value, press [SHIFT] [°’”] (FACT) or [=].

Note: The types of values described below cannot be factored, even if they have 10 or fewer digits.

• One of the prime factors of the value is 1,018,081 or greater.
• Two or more of the prime factors of the value have more than three digits.
The part that cannot be factored will be enclosed in parentheses on the display.

Calculation History and Replay

Calculation History

An ▲ and/or ▼ at the top of the display indicates that there is more calculation history content above and/or below. You can scroll through calculation history contents using ⊙ and ⊙.

2 + 2 = 4	2 ⊞ 2 ⊟	4
3 + 3 = 6	3 ⊞ 3 ⊟	6
	(Scrolls back.) ⊙	4

Note: Calculation history data is all cleared whenever you press [ON], when you change to a different calculation mode, when you change the Input/Output setting, or whenever you perform a RESET operation ("Initialize All" or "Setup Data").

Replay

While a calculation result is on the display, you can press ⊙ or ⊙ to edit the expression you used for the previous calculation.

4 × 3 + 2 = 14	4 ⊠ 3 ⊞ 2 ⊟	14
4 × 3 − 7 = 5	(Continuing) ⊙ [DEL] [DEL] ⊟ 7 ⊟	5

Using Memory Functions

Answer Memory (Ans)

The last calculation result obtained is stored in Ans (answer) memory.

To divide the result of 14 × 13 by 7

14 ⊠ 13 ⊟	182

```
Ans÷7


                                    26
```

(Continuing) ⊟ 7 ⊟

123 + 456 = 579	123 ⊞ 456 ⊟	579
789 − 579 = 210	(Continuing) 789 ⊟ [Ans] ⊟	210

Variables (A, B, C, D, E, F, M, *x*, *y*)

You can assign values to variables and use the variables in calculations.

To assign the result of 3 + 5 to variable A

3 ⊞ 5 [STO] [(−)](A)	8

To multiply the contents of variable A by 10

(Continuing) [ALPHA] [(−)](A) ⊠ 10 ⊟ *1	80

To recall the contents of variable A

(Continuing) [SHIFT] [STO] (RECALL)*2

```
A=8                B=√(2)
C=3.14159265       D=0.42857142
E=1⌐3              F=√(7)
M=7.2115×₁₀¹⁰      x=7⌐3
y=2°15'18"
```

[(−)](A) ⊟	8

To clear the contents of variable A

0 [STO] [(−)] (A)	0

*1 Input a variable as shown here: press [ALPHA] and then press the key that corresponds to the desired variable name.

*2 Pressing [SHIFT] [STO] (RECALL) displays a screen that shows the values currently assigned to variables A, B, C, D, E, F, M, x, and y. On this screen, values are always displayed using the "Norm 1" Number Format. To close the screen without recalling a variable value, press [AC].

Independent Memory (M)

You can add calculation results to or subtract results from independent memory. The "M" appears on the display when there is any value other than zero stored in independent memory.

To clear the contents of M	
0 [STO] [M+] (M)	0
To add the result of 10 × 5 to M	
(Continuing) 10 [×] 5 [M+]	50
To subtract the result of 10 + 5 from M	
(Continuing) 10 [+] 5 [SHIFT] [M+] (M−)	15
To recall the contents of M	
(Continuing) [SHIFT] [STO] (RECALL) [M+] (M) [=]	35

Note: Variable M is used for independent memory. You also can call M and use it in a calculation you are inputting.

Clearing the Contents of All Memories

Ans memory, independent memory, and variable contents are retained even if you press [AC], change the calculation mode, or turn off the calculator. Perform the procedure below when you want to clear the contents of all memories.

[SHIFT] [9] (RESET) [2] (Memory) [=] (Yes)

Function Calculations

Note: To interrupt an ongoing calculation before its result appears, press [AC].

Pi π: π is displayed as 3.141592654, but π = 3.14159265358980 is used for internal calculations.

Natural Logarithm Base e: e is displayed as 2.718281828, but e = 2.71828182845904 is used for internal calculations.

sin, cos, tan, sin⁻¹, cos⁻¹, tan⁻¹: Specify the angle unit before performing calculations.

$\sin 30° = \dfrac{1}{2}$	(Angle Unit: Degree)	[sin] 30 [)] [=]	$\dfrac{1}{2}$

sinh, cosh, tanh, sinh⁻¹, cosh⁻¹, tanh⁻¹: Input a function from the menu that appears when you press [OPTN] [1] (Hyperbolic Func)*1. The angle unit setting does not affect calculations.

*1 Depending on the calculation mode, you should press [OPTN] [▲] [1].

°, ʳ, ᵍ : These functions specify the angle unit. ° specifies degree, ʳ radian, and ᵍ gradian. Input a function from the menu that appears when you perform the following key operation: [OPTN] [2] (Angle Unit)*2.

$\pi/2$ radians = 90° (Angle Unit: Degree)

$\boxed{(}$ $\boxed{\text{SHIFT}}$ $\boxed{\text{x10}^x}$ (π) $\boxed{\div}$ 2 $\boxed{)}$ $\boxed{\text{OPTN}}$ $\boxed{2}$ (Angle Unit) $\boxed{2}$ (ʳ) $\boxed{=}$ 90

*2 Depending on the calculation mode, you should press $\boxed{\text{OPTN}}$ $\boxed{\blacktriangle}$ $\boxed{2}$.

$10^\blacksquare$, $e^\blacksquare$: Exponential functions.
$e^5 \times 2 = 296.8263182$

(MathI/MathO)	$\boxed{\text{SHIFT}}$ $\boxed{\text{In}}$ $(e^\blacksquare)$ 5 $\boxed{\blacktriangleright}$ $\boxed{\times}$ 2 $\boxed{=}$	296.8263182
(LineI/LineO)	$\boxed{\text{SHIFT}}$ $\boxed{\text{In}}$ $(e^\blacksquare)$ 5 $\boxed{)}$ $\boxed{\times}$ 2 $\boxed{=}$	296.8263182

---

log: Logarithmic function. Use $\boxed{\text{log}}$ to input $\log_a b$ as log (a, b). Base 10 is the default setting if you do not input anything for a.

$\log_{10} 1000 = \log 1000 = 3$ $\boxed{\text{log}}$ 1000 $\boxed{)}$ $\boxed{=}$ 3

$\log_2 16 = 4$ $\boxed{\text{log}}$ 2 $\boxed{\text{SHIFT}}$ $\boxed{)}$ (,) 16 $\boxed{)}$ $\boxed{=}$ 4

The $\boxed{\text{log}_\blacksquare\square}$ key also can be used for input, but only while MathI/MathO or MathI/DecimalO is selected for Input/Output on the setup menu. In this case, you must input a value for the base.

$\log_2 16 = 4$ $\boxed{\text{log}_\blacksquare\square}$ 2 $\boxed{\blacktriangleright}$ 16 $\boxed{=}$ 4

In: Natural logarithm to base e.
ln 90 (= $\log_e$ 90) = 4.49980967 $\boxed{\text{In}}$ 90 $\boxed{)}$ $\boxed{=}$ 4.49980967

---

x^2, x^3, $x^\blacksquare$, $\sqrt{\blacksquare}$, $^3\sqrt{\blacksquare}$, $^\blacksquare\sqrt{\square}$, x^{-1}: Powers, power roots, and reciprocals.

$(1 + 1)^{2+2} = 16$ $\boxed{(}$ 1 $\boxed{+}$ 1 $\boxed{)}$ $\boxed{x^\blacksquare}$ 2 $\boxed{+}$ 2 $\boxed{=}$ 16

$(5^2)^3 = 15625$ $\boxed{(}$ 5 $\boxed{x^2}$ $\boxed{)}$ $\boxed{x^3}$ $\boxed{=}$ 15625

$^5\sqrt{32} = 2$

(MathI/MathO)	$\boxed{\text{SHIFT}}$ $\boxed{x^\blacksquare}$ $(^\blacksquare\sqrt{\square})$ 5 $\boxed{\blacktriangleright}$ 32 $\boxed{=}$	2
(LineI/LineO)	5 $\boxed{\text{SHIFT}}$ $\boxed{x^\blacksquare}$ $(^\blacksquare\sqrt{\square})$ 32 $\boxed{)}$ $\boxed{=}$	2

$\sqrt{2} \times 3 = 3\sqrt{2} = 4.242640687 \ldots$

(MathI/MathO)	$\boxed{\sqrt{\blacksquare}}$ 2 $\boxed{\blacktriangleright}$ $\boxed{\times}$ 3 $\boxed{=}$	$3\sqrt{2}$
(LineI/LineO)	$\boxed{\sqrt{\blacksquare}}$ 2 $\boxed{)}$ $\boxed{\times}$ 3 $\boxed{=}$	4.242640687

Pol, Rec: Pol converts rectangular coordinates to polar coordinates, while Rec converts polar coordinates to rectangular coordinates.

- Specify the angle unit before performing calculations.
- The calculation result for r and θ and for x and y are each assigned respectively to variables x and y.
- Calculation result θ is displayed in the range of -180° < θ ≦ 180°.

$\text{Pol}(x, y) = (r, \theta)$ $\text{Rec}(r, \theta) = (x, y)$
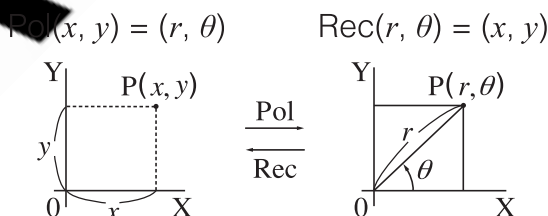
To convert rectangular coordinates $(\sqrt{2}, \sqrt{2})$ to polar coordinates (Angle Unit: Degree)

(MathI/MathO) $\boxed{\text{SHIFT}}$ $\boxed{+}$ (Pol) $\boxed{\sqrt{\blacksquare}}$ 2 $\boxed{\blacktriangleright}$ $\boxed{\text{SHIFT}}$ $\boxed{)}$ (,) $\boxed{\sqrt{\blacksquare}}$ 2 $\boxed{\blacktriangleright}$ $\boxed{)}$ $\boxed{=}$ $r=2, \theta=45$

To convert polar coordinates $(\sqrt{2}, 45°)$ to rectangular coordinates (Angle Unit: Degree)

(MathI/MathO) $\boxed{\text{SHIFT}}$ $\boxed{-}$ (Rec) $\boxed{\sqrt{\blacksquare}}$ 2 $\boxed{\blacktriangleright}$ $\boxed{\text{SHIFT}}$ $\boxed{)}$ (,) 45 $\boxed{)}$ $\boxed{=}$ $x=1, y=1$

$x!$: Factorial function.
$(5 + 3)! = 40320$ $\boxed{(}$ 5 $\boxed{+}$ 3 $\boxed{)}$ $\boxed{\text{SHIFT}}$ $\boxed{x^\blacksquare}$ $(x!)$ $\boxed{=}$ 40320

Abs: Absolute value function.
$|2 - 7| \times 2 = 10$

(MathI/MathO)	$\boxed{\text{Abs}}$ 2 $\boxed{-}$ 7 $\boxed{\blacktriangleright}$ $\boxed{\times}$ 2 $\boxed{=}$	10
(LineI/LineO)	$\boxed{\text{Abs}}$ 2 $\boxed{-}$ 7 $\boxed{)}$ $\boxed{\times}$ 2 $\boxed{=}$	10

Ran#: Function that generates a pseudo random number in the range of 0.000 to 0.999. The result is displayed as a fraction when MathI/MathO is selected for Input/Output on the setup menu.
To obtain random three-digit integers

$$1000 \; \boxed{\text{SHIFT}} \; \boxed{\cdot} \, (\text{Ran\#}) \, \boxed{=} \qquad 459$$

(The result differs with each execution.)

RanInt#: Function that generates a pseudo random integer between a specified start value and end value.
To generate random integers in the range of 1 to 6

$$\boxed{\text{ALPHA}} \; \boxed{\cdot} \, (\text{RanInt})1 \, \boxed{\text{SHIFT}} \; \boxed{)} \, (,) \, 6 \, \boxed{)} \, \boxed{=} \qquad 2$$

(The result differs with each execution.)

***n*Pr, *n*Cr:** Permutation (*n*Pr) and combination (*n*Cr) functions.
To determine the number of permutations and combinations possible when selecting four people from a group of 10

Permutations:	$10 \; \boxed{\text{SHIFT}} \; \boxed{\times} \, (n\text{P}r) \, 4 \boxed{=}$	5040
Combinations:	$10 \; \boxed{\text{SHIFT}} \; \boxed{=} \, (n\text{C}r) \, 4 \boxed{=}$	210

Rnd: Using the Rnd function causes decimal fraction values of the argument to be rounded in accordance with the current Number Format setting. For example, the internal and displayed result of Rnd(10 ÷ 3) is 3.333 when the Number Format setting is Fix 3. Using the Norm 1 or Norm 2 setting cause the argument to be rounded off at the 11th digit of the mantissa part.
To perform the following calculations when Fix 3 is selected for the number of display digits: 10 ÷ 3 × 3 and Rnd(10 ÷ 3) × 3   (MathI/DecimalO)
$\boxed{\text{SHIFT}} \; \boxed{\text{MENU}} \, (\text{SETUP}) \boxed{3} \, (\text{Number Format}) \boxed{1} \, (\text{Fix}) \boxed{3}$

$$10 \boxed{\div} 3 \boxed{\times} 3 \boxed{=} \qquad 10.000$$
$$\boxed{\text{SHIFT}} \; \boxed{0} \, (\text{Rnd}) \, 10 \boxed{\div} 3 \boxed{)} \boxed{\times} 3 \boxed{=} \qquad 9.999$$

Statistical Calculations

Perform the steps below to start a statistical calculation.
1. Press $\boxed{\text{MENU}}$, select the Statistics Mode icon, and then press $\boxed{=}$.
2. On the Select Type screen that appears, select a statistical calculation type.

To select this type of statistical calculation:	Press this key:
Single-variable (x)	$\boxed{1}$ (1-Variable)
Paired-variable (x, y), linear regression	$\boxed{2}$ (y=a+bx)
Paired-variable (x, y), quadratic regression	$\boxed{3}$ (y=a+bx+cx²)
Paired-variable (x, y), logarithmic regression	$\boxed{4}$ (y=a+b·ln(x))
Paired-variable (x, y), e exponential regression	$\boxed{\blacktriangledown}$ $\boxed{1}$ (y=a·e^(bx))
Paired-variable (x, y), ab exponential regression	$\boxed{\blacktriangledown}$ $\boxed{2}$ (y=a·b^x)
Paired-variable (x, y), power regression	$\boxed{\blacktriangledown}$ $\boxed{3}$ (y=a·x^b)
Paired-variable (x, y), inverse regression	$\boxed{\blacktriangledown}$ $\boxed{4}$ (y=a+b/x)

• Performing any of the above key operations displays the Statistics Editor.

Note: When you want to change the calculation type after entering the Statistics Mode, perform the key operation OPTN $\boxed{1}$ (Select Type) to display the calculation type selection screen.

Inputting Data with Statistics Editor

Statistics Editor displays one, two, or three columns: single-variable (x), single variable and frequency (x, Freq), paired-variable (x, y), paired-variable and frequency (x, y, Freq). The number of data rows that can be input depends on the number of columns: 160 rows for one column, 80 rows for two columns, 53 rows for three columns.

Note
- Use the Freq (frequency) column to input the quantity (frequency) of identical data items. Display of the Freq column can be turned on (displayed) or off (not displayed) using the Statistics setting on the setup menu.
- Pressing the AC key while the Statistics Editor is on the screen will display a statistical calculation screen for performing calculations based on the input data. What you need to do to return to the Statistics Editor from the statistical calculation screen depends on the calculation type you selected. Press OPTN $\boxed{3}$ (Data) if you selected single-variable or OPTN $\boxed{4}$ (Data) if you selected paired-variable.

Ex 1: To select logarithmic regression and input the following data: (170, 66), (173, 68), (179, 75)

OPTN $\boxed{1}$ (Select Type) $\boxed{4}$ (y=a+b·ln(x))

170 $\boxed{=}$ 173 $\boxed{=}$ 179 $\boxed{=}$ $\odot$ $\odot$
66 $\boxed{=}$ 68 $\boxed{=}$ 75 $\boxed{=}$

Important: All data currently input in the Statistics Editor is deleted whenever you exit the Statistics Mode, switch between the single-variable and a paired-variable statistical calculation type, or change the Statistics setting on the setup menu.

To delete a line: In the Statistics Editor, move the cursor to the line that you want to delete and then press DEL.

To insert a line: In the Statistics Editor, move the cursor to the location where you want to insert the line and then perform the following key operation: OPTN $\boxed{2}$ (Editor) $\boxed{1}$ (Insert Row).

To delete all Statistics Editor contents: In the Statistics Editor, perform the following key operation: OPTN $\boxed{2}$ (Editor) $\boxed{2}$ (Delete All).

Displaying Statistical Values Based On Input Data

From the Statistics Editor:
OPTN $\boxed{3}$ (1-Variable Calc or 2-Variable Calc)
From the statistical calculation screen:
OPTN $\boxed{2}$ (1-Variable Calc or 2-Variable Calc)

Displaying Regression Calculation Results Based On Input Data (Paired-Variable Data Only)

From the Statistics Editor:
OPTN $\boxed{4}$ (Regression Calc)
From the statistical calculation screen:
OPTN $\boxed{3}$ (Regression Calc)

Obtaining Statistical Values from Input Data

You can use the operations in this section to recall statistical values assigned to variables (σ_x, Σx^2, etc.) based on the data you input with the Statistics Editor. You can also use the variables in calculations. The operations in this section are performed on the statistical calculation screen that appears when you press $\boxed{\text{AC}}$ while the Statistics Editor is displayed. Supported statistical variables and the keys you should press to recall them are shown below. For single-variable statistical calculations, the variables marked with an asterisk (*) are available.

Summation: Σx^*, Σx^{2*}, Σy, Σy^2, Σxy, Σx^3, $\Sigma x^2 y$, Σx^4

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{1}$(Summation) $\boxed{1}$ to $\boxed{8}$

Number of Items: n^* / **Mean:** $\overline{x}^*$, $\overline{y}$ / **Population Variance:** $\sigma^2_x{}^*$, σ^2_y / **Population Standard Deviation:** $\sigma_x{}^*$, σ_y / **Sample Variance:** $s^2_x{}^*$, s^2_y / **Sample Standard Deviation:** $s_x{}^*$, s_y

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{2}$(Variable) $\boxed{1}$ to $\boxed{8}$, $\boxed{\blacktriangledown}$ $\boxed{1}$ to $\boxed{\blacktriangledown}$ $\boxed{3}$

Minimum Value: $\min(x)^*$, $\min(y)$ / **Maximum Value:** $\max(x)^*$, $\max(y)$

$\quad$ When the single-variable statistical calculation is selected:

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{3}$(Min/Max) $\boxed{1}$, $\boxed{5}$

$\quad$ When a paired-variable statistical calculation is selected:

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{3}$(Min/Max) $\boxed{1}$ to $\boxed{4}$

First Quartile: Q_1^* / **Median:** Med* / **Third Quartile:** Q_3^* (For single-variable statistical calculations only)

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{3}$(Min/Max) $\boxed{2}$ to $\boxed{4}$

Regression Coefficients: a, b / **Correlation Coefficient:** r / **Estimated Values:** $\hat{x}$, $\hat{y}$

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{4}$(Regression) $\boxed{1}$ to $\boxed{5}$

Regression Coefficients for Quadratic Regression: a, b, c / **Estimated Values:** $\hat{x}_1$, $\hat{x}_2$, $\hat{y}$

$\quad$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{4}$(Regression) $\boxed{1}$ to $\boxed{6}$

• $\hat{x}$, $\hat{x}_1$, $\hat{x}_2$ and $\hat{y}$ are commands of the type that take an argument immediately before them.

Ex 2: To input the single-variable data $x = \{1, 2, 2, 3, 3, 3, 4, 4, 5\}$, using the Freq column to specify the number of repeats for each items $\{x_n; \text{freq}_n\} = \{1;1, 2;2, 3;3, 4;2, 5;1\}$, and calculate the mean.

$\boxed{\text{SHIFT}}$ $\boxed{\text{MENU}}$(SETUP)$\boxed{\blacktriangledown}$ $\boxed{1}$(Statistics)$\boxed{1}$(On)
$\boxed{\text{OPTN}}$ $\boxed{1}$(Select Type)$\boxed{1}$(1-Variable)

$\quad\quad\quad\quad$ 1$\boxed{=}$2$\boxed{=}$3$\boxed{=}$4$\boxed{=}$5$\boxed{=}$ $\boxed{\blacktriangledown}$ $\boxed{\blacktriangleright}$
$\quad\quad\quad\quad\quad\quad$ 1$\boxed{=}$2$\boxed{=}$3$\boxed{=}$2$\boxed{=}$

$\quad\quad\quad\quad$ $\boxed{\text{AC}}$ $\boxed{\text{OPTN}}$ $\boxed{\blacktriangledown}$ $\boxed{2}$(Variable)$\boxed{1}$($\overline{x}$)$\boxed{=}$ $\quad\quad$ 3

Ex 3: To calculate the logarithmic regression correlation coefficients for the following paired-variable data and determine the regression formula: $(x, y) =$ (20, 3150), (110, 7310), (200, 8800), (290, 9310). Specify Fix 3 (three decimal places) for results.

$\boxed{\text{SHIFT}}$ $\boxed{\text{MENU}}$(SETUP)$\boxed{\blacktriangledown}$ $\boxed{1}$(Statistics)$\boxed{2}$(Off)
$\boxed{\text{SHIFT}}$ $\boxed{\text{MENU}}$(SETUP)$\boxed{3}$(Number Format)$\boxed{1}$(Fix)$\boxed{3}$
$\boxed{\text{OPTN}}$ $\boxed{1}$(Select Type)$\boxed{4}$(y=a+b·ln(x))

$\quad\quad\quad\quad$ 20$\boxed{=}$110$\boxed{=}$200$\boxed{=}$290$\boxed{=}$ $\boxed{\blacktriangledown}$ $\boxed{\blacktriangleright}$
$\quad\quad\quad\quad$ 3150$\boxed{=}$7310$\boxed{=}$8800$\boxed{=}$9310$\boxed{=}$

AC OPTN ⊙ 4 (Regression) 3 (r) 🟰	0.998
AC OPTN ⊙ 4 (Regression) 1 (a) 🟰	-3857.984
AC OPTN ⊙ 4 (Regression) 2 (b) 🟰	2357.532

Calculating Estimated Values

Based on the regression formula obtained by paired-variable statistical calculation, the estimated value of y can be calculated for a given x-value. The corresponding x-value (two values, x_1 and x_2, in the case of quadratic regression) also can be calculated for a value of y in the regression formula.

Ex 4: To determine the estimate value for y when $x = 160$ in the regression formula produced by logarithmic regression of the data in Ex 3. Specify Fix 3 for the result. (Perform the following operation after completing the operations in Ex 3.)

AC 160 OPTN ⊙ 4 (Regression) 5 ($\hat{y}$) 🟰	8106.898

Important: Regression coefficient, correlation coefficient, and estimated value calculations can take considerable time when there are a large number of data items.

Creating a Number Table

The Table Mode generates a number table based on one or two functions.

Example: To generate a number table for the functions $f(x) = x^2 + \dfrac{1}{2}$ and $g(x) = x^2 - \dfrac{1}{2}$ for the range $-1 \leqq x \leqq 1$, incremented in steps of 0.5

1. Press MENU, select the Table Mode icon, and then press 🟰.
2. Configure settings to generate a number table from two functions.
   SHIFT MENU (SETUP) ⊙ 2 (Table) 2 ($f(x),g(x)$)
3. Input $x^2 + \dfrac{1}{2}$.

   ALPHA) (x) x^2 ➕ 1 ▤ 2 $f(x)=x^2+\dfrac{1}{2}$

4. Input $x^2 - \dfrac{1}{2}$.

   🟰 ALPHA) (x) x^2 ➖ 1 ▤ 2 $g(x)=x^2-\dfrac{1}{2}$

5. Press 🟰. On the Table Range dialog box that appears, input values for Start (Default: 1), End (Default: 5), and Step (Default: 1).

   ⊖ 1 🟰 1 🟰 0.5 🟰

   ```
   Table Range
    Start:-1
    End  :1
    Step :0.5
   ```

6. Press 🟰 to generate the number table.
   • Press AC to return to the screen in step 3.

	x	$f(x)$	$g(x)$
1	-1	1.5	0.5
2	-0.5	0.75	-0.25
3	0	0.5	-0.5
4	0.5	0.75	-0.25

Tip
• In the number table shown in step 6, you can change the value in the currently highlighted x cell. Changing the x value causes the $f(x)$ and $g(x)$ values in the same line to be updated accordingly.

- If there is value in the x cell above the currently highlighted x cell, pressing ⊞ or ⊟ automatically inputs into the highlighted cell the value equal to the value of the cell above it plus the step value. So also, pressing ⊟ automatically inputs the value equal to the value of the cell above less the step value. The $f(x)$ and $g(x)$ values in the same line are also updated accordingly.

Note
- After pressing ⊟ in step 4 above, proceeding from step 5 onwards without inputting anything for $g(x)$ will generate a number table for $f(x)$ only.
- The maximum number of rows in the generated number table depends on the setup menu table setting. Up to 45 rows are supported for the "$f(x)$" setting, while 30 rows are supported for the "$f(x),g(x)$" setting.
- The number table generation operation causes the contents of variable x to be changed.

Important: Functions input in this mode are deleted whenever the Input/Output settings are changed in the Table Mode.

Errors

The calculator will display an error message whenever an error occurs for any reason during a calculation. While an error message is displayed, press ◀ or ▶ to return to the calculation screen. The cursor will be positioned at the location where the error occurred, ready for input.

To clear the error message: While an error message is displayed, press AC to return to the calculation screen. Note that this also clears the calculation that contained the error.

Error Messages

Math ERROR
- The intermediate or final result of the calculation you are performing exceeds the allowable calculation range.
- Your input exceeds the allowable input range (particularly when using functions).
- The calculation you are performing contains an illegal mathematical operation (such as division by zero).
- → Check the input values, reduce the number of digits, and try again.
- → When using independent memory or a variable as the argument of a function, make sure that the memory or variable value is within the allowable range for the function.

Stack ERROR
- The calculation you are performing has caused the capacity of the numeric stack or the command stack to be exceeded.
- → Simplify the calculation expression so it does not exceed the capacity of the stack.
- → Try splitting the calculation into two or more parts.

Syntax ERROR
- There is a problem with the format of the calculation you are performing.

Argument ERROR
- There is a problem with the argument of the calculation you are performing.

Range ERROR
- An attempt to generate a number table in the Table Mode whose conditions cause it to exceed the maximum number of allowable rows.

→ Narrow the table calculation range by changing the Start, End, and Step values, and try again.

Before Assuming Malfunction of the Calculator...

Note that you should make separate copies of important data before performing these steps.

1. Check the calculation expression to make sure that it does not contain any errors.
2. Make sure that you are using the correct mode for the type of calculation you are trying to perform.
3. If the above steps do not correct your problem, press the [ON] key.
   • This will cause the calculator to perform a routine that checks whether calculation functions are operating correctly. If the calculator discovers any abnormality, it automatically initializes the calculation mode and clears memory contents.
4. Return the calculation mode and setup (except for the Contrast setting) to their initial default settings by performing the following operation: [SHIFT] [9] (RESET) [1] (Setup Data) [=] (Yes).

Replacing the Battery

A low battery is indicated by a dim display, even if contrast is adjusted, or by failure of figures to appear on the display immediately after you turn on the calculator. If this happens, replace the battery with a new one.
Important: Removing the battery will cause all of the calculator's memory contents to be deleted.

1. Press [SHIFT] [AC] (OFF) to turn off the calculator.
   • To ensure that you do not accidentally turn on power while replacing the battery, slide the hard case onto the front of the calculator.
2. As shown in the illustration, remove the cover, remove the battery, and then load a new battery with its plus (+) and minus (−) ends facing correctly.
3. Replace the cover.

Screw   Screw   Screw

fx-82/350EX   fx-85EX
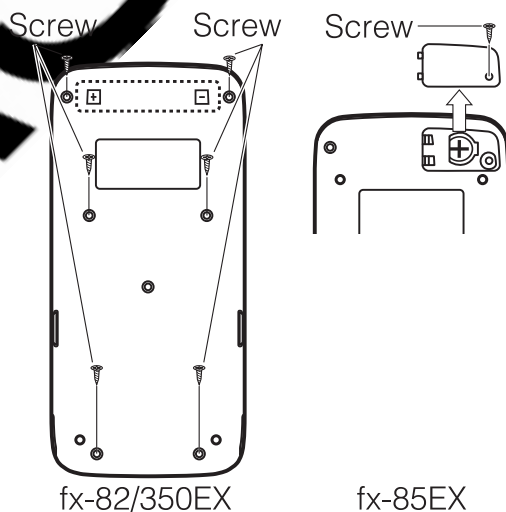
4. Initialize the calculator: [ON] [SHIFT] [9] (RESET) [3] (Initialize All) [=] (Yes).
   • Do not skip the above step!

Technical Information

Calculation Range and Precision

Calculation Range	$\pm 1 \times 10^{-99}$ to $\pm 9.999999999 \times 10^{99}$ or 0
Number of Digits for Internal Calculation	15 digits

Precision		In general, ±1 at the 10th digit for a single calculation. Precision for exponential display is ±1 at the least significant digit. Errors are cumulative in the case of consecutive calculations.

Function Calculation Input Ranges and Precision

Functions	Input Range	
sin$x$ cos$x$	Degree	$0 \leqq |x| < 9 \times 10^9$
	Radian	$0 \leqq |x| < 157079632.7$
	Gradian	$0 \leqq |x| < 1 \times 10^{10}$
tan$x$	Degree	Same as sin$x$, except when $|x| = (2n-1) \times 90$.
	Radian	Same as sin$x$, except when $|x| = (2n-1) \times \pi/2$.
	Gradian	Same as sin$x$, except when $|x| = (2n-1) \times 100$.
$\sin^{-1}x$, $\cos^{-1}x$	$0 \leqq |x| \leqq 1$	
$\tan^{-1}x$	$0 \leqq |x| \leqq 9.999999999 \times 10^{99}$	
sinh$x$, cosh$x$	$0 \leqq |x| \leqq 230.2585092$	
$\sinh^{-1}x$	$0 \leqq |x| \leqq 4.999999999 \times 10^{99}$	
$\cosh^{-1}x$	$1 \leqq x \leqq 4.999999999 \times 10^{99}$	
tanh$x$	$0 \leqq |x| \leqq 9.999999999 \times 10^{99}$	
$\tanh^{-1}x$	$0 \leqq |x| \leqq 9.999999999 \times 10^{-1}$	
log$x$, ln$x$	$0 < x \leqq 9.999999999 \times 10^{99}$	
10^x	$-9.999999999 \times 10^{99} \leqq x \leqq 99.99999999$	
e^x	$-9.999999999 \times 10^{99} \leqq x \leqq 230.2585092$	
$\sqrt{x}$	$0 \leqq x < 1 \times 10^{100}$	
x^2	$|x| < 1 \times 10^{50}$	
x^{-1}	$|x| < 1 \times 10^{100}$; $x \neq 0$	
$\sqrt[3]{x}$	$|x| < 1 \times 10^{100}$	
$x!$	$0 \leqq x \leqq 69$ (x is an integer)	
nPr	$0 \leqq n < 1 \times 10^{10}$, $0 \leqq r \leqq n$ (n, r are integers) $1 \leqq \{n!/(n-r)!\} < 1 \times 10^{100}$	
nCr	$0 \leqq n < 1 \times 10^{10}$, $0 \leqq r \leqq n$ (n, r are integers) $1 \leqq n!/r! < 1 \times 10^{100}$ or $1 \leqq n!/(n-r)! < 1 \times 10^{100}$	
Pol(x, y)	$|x|$, $|y| \leqq 9.999999999 \times 10^{99}$ $\sqrt{x^2 + y^2} \leqq 9.999999999 \times 10^{99}$	

Rec(r, θ)	$0 \leqq r \leqq 9.999999999 \times 10^{99}$ θ: Same as sin$x$
°' "	$\lvert a \rvert$, b, $c < 1 \times 10^{100}$; $0 \leqq b$, c The display seconds value is subject to an error of ±1 at the second decimal place.
$\overleftarrow{\circ}$' "	$\lvert x \rvert < 1 \times 10^{100}$ Decimal ↔ Sexagesimal Conversions 0°0'0" $\leqq$ $\lvert x \rvert$ $\leqq$ 9999999°59'59"
x^y	$x > 0$: $-1 \times 10^{100} < y\log x < 100$ $x = 0$: $y > 0$ $x < 0$: $y = n$, $\dfrac{m}{2n + 1}$ (m, n are integers) However: $-1 \times 10^{100} < y\log \lvert x \rvert < 100$
$\sqrt[x]{y}$	$y > 0$: $x \neq 0$, $-1 \times 10^{100} < 1/x \log y < 100$ $y = 0$: $x > 0$ $y < 0$: $x = 2n+1$, $\dfrac{2n + 1}{m}$ ($m \neq 0$; m, n are integers) However: $-1 \times 10^{100} < 1/x \log \lvert y \rvert < 100$
$a\,{}^b/_c$	Total of integer, numerator, and denominator must be 10 digits or less (including separator symbol).
RanInt#(a, b)	$a < b$; $\lvert a \rvert$, $\lvert b \rvert < 1 \times 10^{10}$; $b - a < 1 \times 10^{10}$

- Precision is basically the same as that described under "Calculation Range and Precision", above.
- x^y, $\sqrt[x]{y}$, $\sqrt[3]{\ }$, $x!$, nPr, nCr type functions require consecutive internal calculation, which can cause accumulation of errors that occur with each calculation.
- Error is cumulative and tends to be large in the vicinity of a function's singular point and inflection point.
- The range for calculation results that can be displayed in π form when MathI/MathO is selected for Input/Output on the setup menu is $\lvert x \rvert < 10^6$. Note, however, that internal calculation error can make it impossible to display some calculation results in π form. It also can cause calculation results that should be in decimal form to appear in π form.

Specifications
Power Requirements:
    fx-82EX: AAA-size battery R03 (UM-4) × 1
    fx-350EX: AAA-size battery LR03 (AM4) × 1
    fx-85EX: Built-in solar cell; button battery LR44 × 1
Approximate Battery Life (based on one hour of operation per day):
    fx-82/85EX: 2 years
    fx-350EX: 1 year
Power Consumption: 0.0006 W (fx-82/350EX)
Operating Temperature: 0°C to 40°C (32°F to 104°F)
Dimensions:
    fx-82/350EX: 13.8 (H) × 77 (W) × 165.5 (D) mm
                       $^1/_2$" (H) × 3" (W) × $6^1/_2$" (D)
    fx-85EX: 11.1 (H) × 77 (W) × 165.5 (D) mm
                       $^3/_8$" (H) × 3" (W) × $6^1/_2$" (D)

Approximate Weight:
 fx-82/350EX: 100 g (3.5 oz) including the battery
 fx-85EX: 90 g (3.2 oz) including the battery

■■ Frequently Asked Questions ■■

How can I change a fraction form result produced by a division operation to decimal form?
→ While a fraction calculation result is displayed, press [S⇔D]. To have calculation results initially appear as decimal values, change the setup menu Input/Output setting to MathI/DecimalO.

What is the difference between Ans memory, independent memory, and variable memory?
→ Each of these types of memory acts like "containers" for temporary storage of a single value.
 Ans Memory: Stores the result of the last calculation performed. Use this memory to carry the result of one calculation on to the next.
 Independent Memory: Use this memory to totalize the results of multiple calculations.
 Variables: This memory is helpful when you need to uses the same value multiple times in one or more calculations.

What is the key operation to take me from the Statistics Mode or Table Mode to a mode where I can perform arithmetic calculations?
→ Press [MENU] [1] (Calculate).

How can I return the calculator to its initial default settings?
→ Perform the following operation to initialize calculator settings (except the Contrast setting): [SHIFT] [9] (RESET) [1] (Setup Data) [=] (Yes).

When I execute a function calculation, why do I get a calculation result that is completely different from older CASIO calculator models?
→ With a Natural Textbook Display model, the argument of a function that uses parentheses must be followed by a closing parenthesis. Failing to press [)] after the argument to close the parentheses may cause unwanted values or expressions to be included as part of the argument.

Example: (sin 30) + 15 (Angle Unit: Degree)		
Older (S-V.P.A.M.) Model:	[sin] 30 [+] 15 [=]	15.5
Natural Textbook Display Model:		
(LineI/LineO)	[sin] 30 [)] [+] 15 [=]	15.5
Failure to press [)] here as shown below will result in calculation of sin 45.		
	[sin] 30 [+] 15 [=]	0.7071067812

This mark applies in EU countries only.

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