

# fx-82MS fx-82SX PLUS fx-85MS fx-220 PLUS fx-300MS fx-350MS

## User's Guide

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# CASIO

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### 1. Important Information

- 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.
- The contents of this manual are subject to change without notice.
- In no event shall CASIO Computer Co., Ltd. be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of the purchase or use of this product and items that come with it. Moreover, CASIO Computer Co., Ltd. shall not be liable for any claim of any kind whatsoever by any other party arising out of the use of this product and the items that come with it.
- Be sure to keep all user documentation handy for future reference.

### 2. Sample Operations

Sample operations in this manual are indicated by a icon. Unless specifically stated, all sample operations assume that the calculator is in its initial default setup. Use the procedure under "3. Initializing the Calculator" to return the calculator to its initial default setup.

### 3. Initializing the Calculator

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

fx-82MS/85MS/300MS/350MS:  $\text{MODE}$  (CLR)  $\text{2}$  (All)  $\text{=}$   
fx-82SX PLUS/220 PLUS:  $\text{MODE}$   $\text{2}$  (All)  $\text{=}$

### 4. 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.

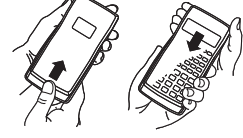
### 5. Handling Precautions

- Dim figures on the display of the calculator indicate that battery power is low. Continued use of the calculator when the battery is low can result in improper operation. Replace the battery as soon as possible when display figures becomes dim. Even if the calculator is operating normally, replace the battery at least once every two years (fx-82MS/82SX PLUS/220 PLUS), or three years (fx-85MS/300MS/350MS). A dead battery can leak, causing damage to and malfunction of the calculator. Never leave a dead battery in the calculator.
- 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.
- Do not use an oxyride battery\* or any other type of nickel-based primary battery with this product. Incompatibility between such batteries and product specifications can result in shorter battery life and product malfunction.
- 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.
- \* Company and product names used in this manual may be registered trademarks or trademarks of their respective owners.

### 6. Removing the Hard Case

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.



### 7. Turning Power On and Off

Press  $\text{ON}$  to turn on the calculator.  
Press  $\text{SHIFT}$   $\text{AC}$  (OFF) to turn off the calculator.

**Auto Power Off**  
Your calculator will turn off automatically if you do not perform any operation for about 10 minutes.

### 8. Adjusting Display Contrast

- Press the  $\text{MODE}$  key a number of times until you reach the setup screen shown to the right.
- Press  $\text{2}$ .
- Use  $\text{Left Arrow}$  and  $\text{Right Arrow}$  to adjust contrast.
- After the setting is the way you want, press  $\text{AC}$ .

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

### 9. Reading the Display

The display of the calculator shows expressions you input, calculation results, and various indicators.

Input expression → Indicators  
Calculation result →

### 10. Specifying the Calculation Mode

When you want to perform this type of operation:	Perform this key operation:
General calculations	$\text{MODE}$ $\text{1}$ (COMP)
Standard deviation	$\text{MODE}$ $\text{2}$ (SD)
Regression calculations (fx-82MS/85MS/300MS/350MS only)	$\text{MODE}$ $\text{3}$ (REG)

**Note:** • The initial default calculation mode is the COMP Mode.  
• Mode indicators appear in the upper part of the display. Be sure to check the current calculation mode (COMP, SD, REG) and angle unit setting (Deg, Rad, Gra) before beginning a calculation.

### 11. Configuring the Calculator Setup

Pressing the  $\text{MODE}$  key more than once displays additional setup screens. Underlined (   ) settings are initial defaults.

$\text{1}$ <u>Deg</u> $\text{2}$ Rad $\text{3}$ Gra Specifies degrees, radians or grads as the angle unit for value input and calculation result display.	Deg Rad Gra 1 2 3
<b>Note:</b> In this manual, the <u>Deg</u> symbol next to a sample operation indicates degrees.	

$\text{1}$ Fix $\text{2}$ Sci $\text{3}$ Norm Specifies the number of digits for display of a calculation result.	Fix Sci Norm 1 2 3
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**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:  $100 \div 7 = 14.286$  (Fix 3)

**Sci:** The value you specify (from 1 to 10) controls the number of significant digits for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.  
Example:  $1 \div 7 = 1.4286 \times 10^{-1}$  (Sci 5)

**Norm:** Selecting one of the two available settings (Norm 1, Norm 2) determines the range in which results will be displayed in non-exponential format. Outside the specified range, results are displayed using exponential format.  
Norm 1:  $10^{-2} > |x|$ ,  $|x| \geq 10^10$  Norm 2:  $10^{-9} > |x|$ ,  $|x| \geq 10^10$   
Example:  $1 \div 200 = 5 \times 10^{-3}$  (Norm 1); 0.005 (Norm 2)

Disp $\text{1}$ <u>ab/c</u> $\text{2}$ d/c Specifies either mixed fraction (ab/c) or improper fraction (d/c) for display of fractions in calculation results.	ab/c d/c 1 2	Dot Comma 1 2
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$\text{1}$  ab/c  $\text{2}$  d/c Specifies either mixed fraction (ab/c) or improper fraction (d/c) for display of fractions in calculation results.  
 $\text{1}$  Dot  $\text{2}$  Comma Specifies whether to display a dot or a comma for the calculation result decimal point. A dot is always displayed during input.

### 12. Inputting Expressions and Values

Perform the following procedure to initialize the calculator, which returns the calculation mode to COMP and returns all other settings, including setup menu settings, to their initial defaults.

fx-82MS/85MS/300MS/350MS:  $\text{MODE}$  (CLR)  $\text{2}$  (Mode)  $\text{=}$   
fx-82SX PLUS/220 PLUS:  $\text{MODE}$   $\text{2}$  (Mode)  $\text{=}$

**Note:** • The memory area used for calculation input can hold 79 "steps". One step is taken up each time you press a number key or arithmetic operator key ( $\text{+}$ ,  $\text{-}$ ,  $\text{x}$ ,  $\text{y}$ ). A  $\text{SHIFT}$  or  $\text{ALPHA}$  (fx-82MS/85MS/300MS/350MS only) key operation does not take up a step, so inputting  $\text{SHIFT}$   $\text{2}$  ( $x^2$ ), for example, takes up only one step.  
• Whenever you input the 73rd step of any calculation, the cursor changes from " " to " " to let you know memory is running low.

### 13. Calculation Priority Sequence

When the priority of two expressions is the same, the calculation is performed from left to right.

1st	Function with parentheses: Pol(x, y), Rec(r, θ), RanInt#(a, b)* (*fx-82SX PLUS/220 PLUS only)
2nd	Type A functions: With these functions, the value is entered and then the function key is pressed. ( $x^3$ , $x^2$ , $x^{-1}$ , $x!$ , $e^{**}$ , $\hat{x}$ , $\hat{x}_1$ , $\hat{x}_2$ , $\hat{y}$ , $\hat{y}_1$ , $\hat{y}_2$ , $t$ , $\theta$ )
3rd	Powers and roots: $\wedge(x^y)$ , $\sqrt{\quad}$
4th	Fractions
5th	Implied multiplication of $\pi$ , $e$ (natural logarithm base), memory name, or variable name: $2\pi$ , $3e$ , $5A$ , $\pi A$ , etc.
6th	Type B functions: With these functions, the function key is pressed and then the value is entered. ( $\sqrt{\quad}$ , $\sqrt[3]{\quad}$ , $\log$ , $\ln$ , $e^{\quad}$ , $10^{\quad}$ , $\sin$ , $\cos$ , $\tan$ , $\sin^{-1}$ , $\cos^{-1}$ , $\tan^{-1}$ , $\sinh$ , $\cosh$ , $\tanh$ , $\sinh^{-1}$ , $\cosh^{-1}$ , $\tanh^{-1}$ , (-))
7th	Implied multiplication of Type B functions: $2\sqrt{3}$ , $A \log 2$ , etc.
8th	Permutation ( $nPr$ ), combination ( $nCr$ )
9th	Multiplication, division ( $\times$ , $\div$ )
10th	Addition, subtraction ( $+$ , $-$ )

### 14. Correcting and Clearing an Expression

To delete a single character or function:  
 $1234 \rightarrow$   $\text{DEL}$   $\text{DEL}$   $\rightarrow$   $124$   
To insert a character or function into a calculation:  
 $123 \rightarrow$   $\text{SHIFT}$   $\text{DEL}$  (INS)  $\text{4}$   $\rightarrow$   $1243$   
• The cursor changes from " " to "C".  
To clear all of the calculation you are inputting: Press  $\text{AC}$ .

### 15. Basic Calculations

#### 15.1 Fraction Calculations

**Note:** • Mixing fractions and decimal values in a calculation 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 format: Press  $\text{SHIFT}$   $\text{=}$  (d/c).

To switch a calculation result between fraction and decimal format: Press  $\text{=}$ .

#### 15.2 Percent Calculations

#### 15.3 Degree, Minute, Second (Sexagesimal) Calculations

The following is the input format for a sexagesimal value: (degrees) {minutes} {seconds} { }.

**Note:** You must always input something for the degrees and minutes, even if they are zero.

### 16. Multi-Statements (fx-82MS/85MS/300MS/350MS only)

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

### 17. Using Engineering Notation

A simple key operation transforms a displayed value to engineering notation.

### 18. Calculation History (Not included on the fx-82SX PLUS)

In the COMP Mode, the calculator remembers up to approximately 150 bytes of data for the newest calculation. You can scroll through calculation history contents using  $\text{Up Arrow}$  and  $\text{Down Arrow}$ .

**Note:** Calculation history data is all cleared whenever you press  $\text{ON}$ , when you change to a different calculation mode, or whenever you initialize modes and settings.

### 19. Replay (Not included on the fx-82SX PLUS)

While a calculation result is on the display, you can press  $\text{Left Arrow}$  or  $\text{Right Arrow}$  to edit the expression you used for the previous calculation.

### 20. Answer Memory (Ans)

The last calculation result obtained is stored in Ans (answer) memory. Ans memory contents are updated whenever a new calculation result is displayed.

### 21. Variables (A, B, C, D, E, F, X, Y) (fx-82MS/85MS/300MS/350MS only)

Your calculator has eight preset variables named A, B, C, D, E, F, X, and Y.

### 22. 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.

**Note:** Variable M is used for independent memory.

### 23. Clearing the Contents of All Memories

Independent memory and variable contents are retained even if you press  $\text{AC}$ , change the calculation mode, or turn off the calculator. Perform the following procedure when you want to clear the contents of all memories.

fx-82MS/85MS/300MS/350MS:  $\text{MODE}$  (CLR)  $\text{1}$  (Mcl)  $\text{=}$   
fx-82SX PLUS/220 PLUS:  $\text{MODE}$   $\text{1}$  (Mcl)  $\text{=}$

### 24. Function Calculations

$\pi$ :  $\pi$  is displayed as 3.141592654, but  $\pi = 3.14159265358980$  is used for internal calculations.

$e$  (fx-82MS/85MS/300MS/350MS only):  $e$  is displayed as 2.718281828, but  $e = 2.71828182845904$  is used for internal calculations.

**sin**, **cos**, **tan**, **sin<sup>-1</sup>**, **cos<sup>-1</sup>**, **tan<sup>-1</sup>**: Trigonometric functions. Specify the angle unit before performing calculations. See  $\text{1}$ .

**sinh**, **cosh**, **tanh**, **sinh<sup>-1</sup>**, **cosh<sup>-1</sup>**, **tanh<sup>-1</sup>**: Hyperbolic functions. The angle unit setting does not affect calculations. See  $\text{2}$ .

$^{\circ}$ ,  $^{\circ}$ ,  $^{\circ}$ : These functions specify the angle unit.  $^{\circ}$  specifies degrees,  $^{\circ}$  radians, and  $^{\circ}$  grads. Input a function from the menu that appears when you perform the following key operation:  $\text{SHIFT}$   $\text{ALPHA}$  (DRG  $\blacktriangleright$ ). See  $\text{3}$ .

$10^{\quad}$ ,  $e^{\quad}$ : Exponential functions. See  $\text{4}$ .

**log**: Logarithmic function. See  $\text{5}$ .

**In**: Natural logarithm to base  $e$ . See  $\text{6}$ .

$x^2$ ,  $x^3$ ,  $\wedge(x^y)$ ,  $\sqrt{\quad}$ ,  $\sqrt[3]{\quad}$ ,  $\sqrt{\quad}$ ,  $x^{-1}$ : Powers, power roots, and reciprocals. See  $\text{7}$ .

**Pol**, **Rec**: Pol converts rectangular coordinates to polar coordinates, while Rec converts polar coordinates to rectangular coordinates. See  $\text{8}$ .

		Specify the angle unit before performing calculations. Calculation result $\theta$ is displayed in the range of $-180^{\circ} < \theta \leq 180^{\circ}$ .
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**Rectangular Coordinates (Rec)**      **Polar Coordinates (Pol)**

$x!$ : Factorial function. See  $\text{9}$ .

**Ran#**: Generates a 3-digit pseudo random number that is less than 1. See  $\text{10}$ .

**RanInt#** (fx-82SX PLUS/220 PLUS only): For input of the function of the form  $\text{RanInt#}(a, b)$ , which generates a random integer within the range of  $a$  to  $b$ . See  $\text{11}$ .

**nPr**, **nCr**: Permutation ( $nPr$ ) and combination ( $nCr$ ) functions. See  $\text{12}$ .

**Rnd**: The argument of this function is made a decimal value and then rounded in accordance with the current number of display digits setting (Norm, Fix, or Sci). With Norm 1 or Norm 2, the argument is rounded off to 10 digits. See  $\text{13}$ .

**Note:** Using functions can slow down a calculation, which may delay display of the result. To interrupt an ongoing calculation before its result appears, press  $\text{AC}$ .

### 25. Examples

