fx-100W
fx-115W
fx-570W
fx-991W

## User's Guide

CASIO.

Removing and Replacing the Calculator's Cover

• To Remove the cover

Grasp the top of the cover, and slide the unit out from the bottom.

• To Replace the cover

Grasp the top of the cover, and slide the unit in from the bottom.

Always slide the unit into the cover with the unit's display end first. Never slide the keyboard end of the unit into the cover.
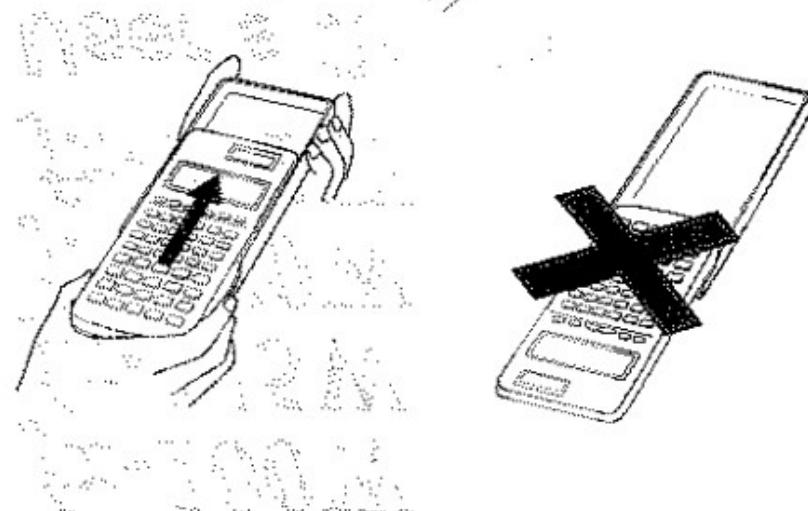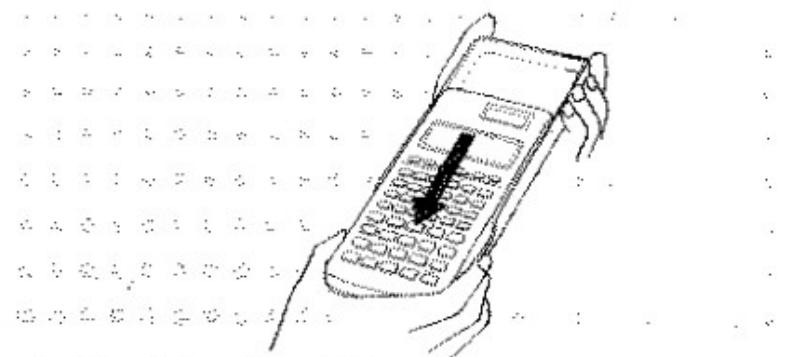
Safety Precautions

Be sure to read the following safety precautions before using this calculator. Keep this manual handy for later reference.

⚠ Caution

This symbol is used to indicate information that can result in personal injury or material damage if ignored.

Batteries

* After removing the batteries from the calculator, put them in a safe place where there is no danger of them getting into the hands of small children and accidently swallowed.
* Keep batteries out of the reach of small children. If accidently swallowed, consult with a physician immediately.
* Never charge batteries, try to take batteries apart, or allow batteries to become shorted. Never expose batteries to direct heat or dispose of them by incineration.
* Misuse of batteries can cause them to leak acid that can cause damage to nearby items and creates the possibility of fire and personal injury.
  * Always make sure that a battery's positive ⊕ and negative ⊖ sides are facing correctly when you load it into the calculator.
  * Remove the batteries if you do not plan to use the calculator for a long time.
  * Use only the type of batteries specified for this calculator in this manual.

Disposing of the Calculator

* Never dispose of the calculator by burning it. Doing so can cause certain components to suddenly burst, creating the danger of fire and personal injury.

Handling Precautions

- **Be sure to press the P button on the back of the calculator (step ⑥ on page 35 or 36) before using it for the first time (fx-570W/ fx-100W).**
- **Be sure to press the $\boxed{\text{ON}}$ key before using the calculator for the first time (fx-991W/ fx-115W).**
- **Even if the calculator is operating normally, replace the battery at least once every three years for the fx-570W/ fx-991W/ fx-115W, or at least once every two years for the fx-100W.**

  Dead battery can leak, causing damage to and malfunction of the calculator. Never leave the dead battery in the calculator.
- **The battery that comes with the calculator when you purchase it is for testing only. It may not provide full service life.**
- **Low battery power can cause memory contents to become corrupted or lost completely. Always keep written records of all important data.**

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- **Avoid use and storage in areas subjected to temperature extremes.**

  Very low temperatures can cause slow display response, total failure of the display, and shortening of battery life. Also avoid leaving the calculator in direct sunlight, near a window, near a heater or anywhere else it might become exposed to very high temperatures. Heat can cause discoloration or deformation of the calculator's case, and damage to internal circuitry.

- **Avoid use and storage in areas subjected to large amounts of humidity and dust.**

  Take care never to leave the calculator where it might be splashed by water or exposed to large amounts of humidity or dust. Such elements can damage internal circuitry.

- **Never drop the calculator or otherwise subject it to strong impact.**

- **Never twist or bend the calculator.**

  Avoid carrying the calculator in the pocket of your trousers or other tight-fitting clothing where it might be subjected to twisting or bending.

- **Never try to take the calculator apart.**

- **Never press the keys of the calculator with a ball-point pen or other pointed object.**

- **Use a soft, dry cloth to clean the exterior of the unit.**

  If the calculator becomes very dirty, wipe it off with a cloth moistened in a weak solution of water and a mild neutral household detergent. Wring out all excess moisture before wiping the calculator. Never use thinner, benzine or other volatile agents to clean the calculator. Doing so can remove printed markings and damage the case.

Contents

Two-line Display

$$5 \times 3 + 2 \sin 60$$
$$16.73205081$$

You can simultaneously check the calculation formula and its answer.

The first line displays the calculation formula.
The second line displays the answer.

Key Layout

< fx-570W >

Page	12	9		
	SHIFT	ALPHA	◄ REPLAY ►	MODE	OFF

Page	25	16 29	25	15	16
	CALC	$\int dx$ $x!$ LOGIC	x^{-1} CONV CONST	$\sqrt[3]{\ }$ x^3	$\sqrt[x]{\ }$ x^y

Page	25	30	16	15 29	15 29
	18..24 $\leftarrow$ i ENG	12 d/c $a\frac{b}{c}$	DEC $\sqrt{\ }$	29 HEX 10^x BIN x^2 log	e^x OCT ln

Page	17	12	15	16	15
	11 A $(-)$	30 11 B $\circ$ ' "	11 C hyp	$\sin^{-1}$ D sin	$\cos^{-1}$ E cos	$\tan^{-1}$ F tan

Page	11	30	14	14	14
	20 DISTR STO	24 Re←→Im RCL	21 24 $\circ$ '' arg (| Abs X)	20 11 Y ,	11 11 M– M M+

Page	11	11	11	11	20 DT CL 20
	21 17 A M 7	21 17 B G 8	21 17 C T 9	9 INS DEL	11 19 Mcl Scl AC/ON

Page	21 17	21 17	21 17	19	19
	$\bar{y}$ μ 4	$y\sigma n$ m 5	$y\sigma n$-1 k 6	nPr ×	nCr ÷

Page	19 17	19 17	19 17	21 18	21 18
	$\bar{x}$ r 1	$x\sigma n$ p 2	$x\sigma n$-1 q 3	$\bar{x}$ Pol(+	$\bar{y}$ Rec(−

Page	16	16	16	15	13
	Rnd 0	Ran# •	π EXP	DRG► Ans	% =

| Page | | | 11 | 10 | |

fx-100W: CONST CONST → $\sqrt{\ }$ (15) $\sqrt[3]{\ }$ x^3 → x^3

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<fx-991W>

Page					
		12	9 REPLAY		2
	SHIFT	ALPHA	◄ ►	MODE	ON

Page	25		16 29 x/LOGIC	25 CONV	15 ³√	16 ˣ√
	= CALC	∫dx	x^{-1}	CONST	x^3	x^y

Page	25	30	16	27	16	15

Page	18 24 i		29 d/c	DEC	29 HEX	15 29 10ˣ BIN	15 29 eˣ OCT
	ENG	$a\frac{b}{c}$	√	x^2	log	ln

Page	17	12	15	16	15	15

Page	11 A	30 11 ◄ B	11 C	sin⁻¹ D	cos⁻¹ E	tan⁻¹ F
	(−)	° ' ''	hyp	sin	cos	tan

Page	11	30	14	14	14	

Page	20 DISTR	24 Re↔Im	21 24	24 11 Abs X	20 11 Y	11 11 M M
	STO	RCL	(	)	,	M+

Page	11	11	11	11		11

Page	21 17 A M	21 17 B G	21 17 C T	9 INS	Mcl÷Scl
	7	8	9	DEL	AC

Page				9	

Page	21 17 ȳ μ	21 17 xσn m	21 17 xσn-1 k	19 nPr	19 nCr
	4	5	6	X	÷

Page	19 17 x̄ f	19 17 xσn p	19 17 xσn-1 n	21 18 x̄ Pol(	21 18 ȳ Rec(
	1	2	3	+	−

Page	16 Rnd	16 Ran#	16 π	15 DRG►	13 %
	0	•	EXP	Ans	=

Page			11	10	

fx-115W: CONST → √ ; x^3 → x^y
15

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Before Starting Calculations...

■ Modes

Application	Mode Name	Mode Indicator
Calculation Modes		
Normal calculations	COMP	—
Complex number calculations	CMPLX	CMPLX
Standard deviation calculations	SD	SD
Regression calculations	REG	REG
Base-n calculations	BASE-N	b (binary) o (octal) d (decimal) H (hexadecimal)
Angle Unit Modes		
Degrees	DEG	**D**
Radians	RAD	**R**
Grads	GRA	**G**
Display Modes		
Exponential notation (Canceling FIX and SCI specification)	NORM1 NORM2	—
Number of decimal place specification	FIX	Fix
Number of significant digit specification	SCI	Sci
Exponential display range specifications	ENG	ENG

Note!

- Mode indicators appear in the lower part of the display, except for the Base-n indicators which appear in the exponent part of the display.
- The ENG mode cannot be selected while the calculator is in the CMPLX or BASE-N mode.

- You cannot set the angle unit or the display mode while the calculator is in the BASE-N mode.
- The COMP, CMPLX, SD, and REG modes can be used in combination with the angle unit modes.
- Be sure to check the current calculation mode (SD, REG, COMP, CMPLX) and angle unit mode (DEG, RAD, GRA) before beginning a calculation.

■ Input Capacity

- The memory area used for calculation input can hold 79 "steps." Whenever you input the 73rd step of any calculation, the cursor changes from "_" to "■" to let you know memory is running low. If you still need to input more, you should divide your calculation into two or more parts.

■ Making Corrections During Input

- Use ◀ and ▶ to move the cursor to the location you want.
- Press DEL to delete the number or function at the current cursor position.
- Press SHIFT INS to change to an insert cursor [ ]. Inputting something while the insert cursor is on the display inserts the input at the insert cursor position.
- Press ◀, ▶, SHIFT INS, or ▬ returns to the normal cursor from the insert cursor.

■ Replay Function

- Pressing ▶ or ◀ recalls the last calculation you performed. You can then make any changes you want in the calculation and re-execute it.
- Pressing AC does not clear Replay memory, so you can recall the last calculation even after you press AC.
- Replay memory is cleared whenever you start a new calculation, change to another mode, or turn off power.

■ Error Locator

- Pressing ▶ or ◀ after an error occurs displays the calculation with the cursor positioned at the location where the error occurred.

■ Exponential Display Formats

This calculator can display up to 10 digits. Larger values are automatically displayed using exponential notation. In the case of decimal values, you can select between two formats that determine at what point exponential notation is used. Press [MODE] [MODE] [MODE] [MODE] [3] [1] (or [2]) to select NORM 1 or NORM 2.

• NORM 1

With NORM 1, exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than two decimal places.

• NORM 2

With NORM 2, exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than nine decimal places.

- All of the examples in this manual show calculation results using the NORM 1 format.

■ Answer Memory

- Whenever you press ▤ after inputting values or an expression, the calculated result is automatically stored in Answer Memory. You can recall Answer Memory contents by pressing [Ans].
- Answer Memory can store up to 12 digits for the mantissa and two digits for the exponent.
- Answer Memory contents are not changed if the operation performed by any of the above key operations results in an error.

Basic Calculations

- Use the COMP mode for basic calculations.
- **Example 1:** $3 \times (5 \times 10^{-9})$

    3 ✖ (5 EXP (-) 9) = | 1.5⁻⁰⁸

- **Example 2:** $5 \times (9+7)$

    5 ✖ (9 ➕ 7) = | 80.

- You can skip all) operations before =.

Memory Calculations

■ Independent Memory

- Values can be input directly into memory, added to memory, or subtracted from memory. Independent memory is convenient for calculating cumulative totals.
- Independent memory uses the same memory area as variable M.
- To clear independent memory (M), input 0 STO M.
- **Example:**

23 + 9 = 32	23 ➕ 9 STO M	32.
53 − 6 = 47	53 ➖ 6 M+	47.
−) 45 × 2 = 90	45 ✖ 2 SHIFT M−	90.
(Total) −11		
	RCL M	−11.

■ Variables

- There are nine variables (A through F, M, X and Y), which can be used to store data, constants, results, and other values.
- Use the following operation to delete data assigned to all nine variables: SHIFT Mcl =.
- Use the following operation to delete data assigned to a particular variable: 0 STO A. This operation deletes the data assigned to variable A.

* **Example:** $\underline{193.2} \div 23 = 8.4$

  $\underline{193.2} \div 28 = 6.9$

193.2 [STO] [A] [÷] 23 [=]	8.4
[RCL] [A] [÷] 28 [=]	6.9

Fraction Calculations

■ Fraction Calculations

* Use the COMP mode for fraction calculations.
* Values are automatically displayed in decimal format whenever the total number of digits of a fractional value (integer + numerator + denominator + separator marks) exceeds 10.

* **Example 1:** $\frac{2}{3} + 1\frac{4}{5}$

  2 [a%] 3 [+] 1 [a%] 4 [a%] 5 [=] | 2⌐7⌐15.

* **Example 2:** $\frac{1}{2} + 1.6$

  1 [a%] 2 [+] 1.6 [=] | 2.1

* Fraction/decimal calculation results are always decimal.

■ Decimal-to-Fraction Conversion

* **Example:** $2.75 \rightarrow 2\frac{3}{4}$

2.75 [=]	2.75
[a%]	2⌐3⌐4.
[SHIFT] [d/c]	11⌐4.

■ Fraction-to-Decimal Conversion

* **Example:** $\frac{1}{2} \leftrightarrow 0.5$ (Fraction ↔ Decimal)

  1 [a%] 2 [=] | 1⌐2.

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$[a\%]$	0.5

$[a\%]$	1⌐2.

Percentage Calculations

- Use the COMP mode for percentage calculations.
- **Example 1:** To calculate 12% of 1500

  1500 ✖ 12 SHIFT % | 180. |
  |---|

- **Example 2:** To calculate what percentage of 880 is 660

  660 ➗ 880 SHIFT % | 75. |
  |---|

- **Example 3:** To add 15% onto 2500

  2500 ✖ 15 SHIFT % ➕ | 2875. |
  |---|

- **Example 4:** To discount 3500 by 25%

  3500 ✖ 25 SHIFT % ➖ | 2625. |
  |---|

- **Example 5:** If 300 grams are added to a test sample originally weighing 500 grams, what is the percentage increase in weight?

$$\frac{300 + 500}{500} \times 100 = 160 \ (\%)$$

  300 ➕ 500 SHIFT % | 160. |
  |---|

- **Example 6:** If temperature changes from 40°C to 46°C, what percentage did it rise?

$$\frac{46 - 40}{40} \times 100 = 15 \ (\%)$$

  46 ➖ 40 SHIFT % | 15. |
  |---|

Scientific Function Calculations

- Use the COMP mode for scientific function calculations.
- $\pi = 3.14159265359$

■ Trigonometric/Inverse Trigonometric Functions

- **Example 1:** sin63°52′41″

  [MODE] [MODE] [MODE] [1] → " **D** "

  [sin] 63 [°'″] 52 [°'″] 41 [°'″] [=]   `0.897859012`

- **Example 2:** $\cos \left(\dfrac{\pi}{3} \text{ rad} \right)$

  [MODE] [MODE] [MODE] [2] → " **R** "

  [cos] [(] [SHIFT] [π] [÷] 3 [)] [=]   `0.5`

- **Example 3:** $\cos^{-1} \dfrac{\sqrt{2}}{2} = \dfrac{\pi}{4}$ rad

  [MODE] [MODE] [MODE] [2] → " **R** "

  [SHIFT] [cos⁻¹] [(] [√⎺] 2 [÷] 2 [)] [=]   `0.785398163`

  [Ans] [÷] [SHIFT] [π] [=]   `0.25`

- **Example 4:** tan⁻¹ 0.741

  [MODE] [MODE] [MODE] [1] → " **D** "

  [SHIFT] [tan⁻¹] 0.741 [=]   `36.53844577`

■ Hyperbolic/Inverse Hyperbolic Functions

- **Example 1:** sinh 3.6

  [hyp] [sin] 3.6 [=]   `18.28545536`

- **Example 2:** sinh⁻¹ 30

  [hyp] [SHIFT] [sin⁻¹] 30 [=]   `4.094622224`

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■ Angle Unit Conversion

- Press [SHIFT] [DRG▸] to display the following menu.

$$\begin{array}{ccc} D & R & G \\ 1 & 2 & 3 \end{array}$$

- Pressing 1, 2, or 3 converts the displayed value to the corresponding angle unit.

- **Example :** To convert 4.25 radians to degrees

[MODE] [MODE] [MODE] 1 → " **D** "

4.25 [SHIFT] [DRG▸] 2 (R) [=] `243.5070629`

■ Common and Natural Logarithms/ Antilogarithms

- **Example 1:** log 1.23   [log] 1.23 [=] `0.089905111`

- **Example 2:** ln 90 (=$\log_e$ 90)

[ln] 90 [=] `4.49980967`

- **Example 3:** e^{10} [SHIFT] [e^x] 10 [=] `22026.46579`

- **Example 4:** $10^{1.5}$ [SHIFT] [10^x] 1.5 [=] `31.6227766`

- **Example 5:** 2^4 2 [x^y] 4 [=] `16.`

■ Square Roots, Cube Roots, Roots, Squares, Cubes, Reciprocals, Factorials, Random Numbers and π

- **Example 1:** $\sqrt{2} + \sqrt{3} \times \sqrt{5}$

[√] 2 [+] [√] 3 [×] [√] 5 [=] `5.287196909`

- **Example 2:** $\sqrt[3]{5} + \sqrt[3]{-27}$

[SHIFT] [³√] 5 [+] [SHIFT] [³√] [(-)] 27 [=] `-1.290024053`

(fx-100W/fx-115W: [³√])

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- **Example 3:** $\sqrt[7]{123}$ ($= 123^{\frac{1}{7}}$)

  7 [SHIFT] [$\sqrt{}$] 123 [=] | 1.988647795 |

- **Example 4:** $123+30^2$

  123 [+] 30 [x^2] [=] | 1023. |

- **Example 5:** 12^3

  12 [x^3] [=] | 1728. |

- **Example 6:** $\dfrac{1}{\dfrac{1}{3}-\dfrac{1}{4}}$

  [(] 3 [x^{-1}] [−] 4 [x^{-1}] [)] [x^{-1}] [=] | 12. |

- **Example 7:** 8!

  8 [SHIFT] [$x!$] [=] | 40320. |

- **Example 8:** To generate a random number between 0.000 and 0.999

  [SHIFT] [Rand] [=] | 0.664 |

  Example results differ each time)

- **Example 9:** 3π

  3 [SHIFT] [π] [=] | 9.424777961 |

■ FIX, SCI, RND

- **Example 1:** $200\div7\times14=400$

  200 [÷] 7 [×] 14 [=] | 400. |

  (Specifies three decimal places.) [MODE] [MODE] [MODE] [MODE] [1] [3] | 400.000 | Fix

  (Calculation continues using 10 display digits) 200 [÷] 7 [=] | 28.571 |

  [×] 14 [=] | 400.000 |

Performing the same calculation using the specified number of decimal places

  200 [÷] 7 [=] | 28.571 |

  (Internal rounding) [SHIFT] [Rnd] | 28.571 |

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| $\boxed{\times}$ 14 $\boxed{=}$ | 399.994 |

- Press $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{3}$ $\boxed{1}$ to clear FIX specification.

- **Example 2:** $1 \div 3$, displaying result with two significant digits (SCI 2)

| $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{2}$ $\boxed{2}$ 1 $\boxed{\div}$ 3 $\boxed{=}$ | 3.3^{-01} |
| | SCI |

- Press $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{3}$ $\boxed{1}$ to clear SCI specification.

■ ENG Calculations

- **Example 1:** To convert 56,088 meters to kilometers
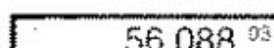
| 56088 $\boxed{=}$ $\boxed{\text{ENG}}$ | 56.088 ^{03} |

- **Example 2:** To convert 0.08125 grams to milligrams
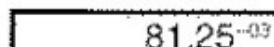
| 0.08125 $\boxed{=}$ $\boxed{\text{ENG}}$ | 81.25 $^{-03}$ |

■ Inputting ENG Calculation Symbols

- $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{1}$ enters the ENG mode in which ENG symbols can be used in calculations.
- To exit the ENG mode, press $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{\text{MODE}}$ $\boxed{2}$.
- The following are the nine ENG symbols that can be used in ENG mode calculations.

Key Operation	Unit	Symbol
$\boxed{\text{SHIFT}}$ $\boxed{\text{k}}$	10^3	k (kilo)
$\boxed{\text{SHIFT}}$ $\boxed{\text{M}}$	10^6	M (Mega)
$\boxed{\text{SHIFT}}$ $\boxed{\text{G}}$	10^9	G (Giga)
$\boxed{\text{SHIFT}}$ $\boxed{\text{T}}$	10^{12}	T (Tera)
$\boxed{\text{SHIFT}}$ $\boxed{\text{m}}$	10^{-3}	m (milli)
$\boxed{\text{SHIFT}}$ $\boxed{\mu}$	10^{-6}	μ (micro)
$\boxed{\text{SHIFT}}$ $\boxed{\text{n}}$	10^{-9}	n (nano)
$\boxed{\text{SHIFT}}$ $\boxed{\text{p}}$	10^{-12}	p (pico)
$\boxed{\text{SHIFT}}$ $\boxed{\text{f}}$	10^{-15}	f (femto)

* For displayed values, the calculator selects the ENG symbol that makes the numeric part of the value fall within the range of 1 to 1000.
* ENG symbols cannot be used when inputting fractions.
* The ENG mode cannot be used in combination with the CMPLX, or BASE-N modes.

• Performing any of the key operations in the above table while you are not in the ENG mode inputs the exponential value in the "Unit" column (without inputting the ENG symbol).

• **Example:** $9 \div 10 = 0.9$ m (milli)

[MODE] [MODE] [MODE] [MODE] [MODE] [1]	0. ENG

9 [÷] 10 [=]	9 ÷ 10 m 900.
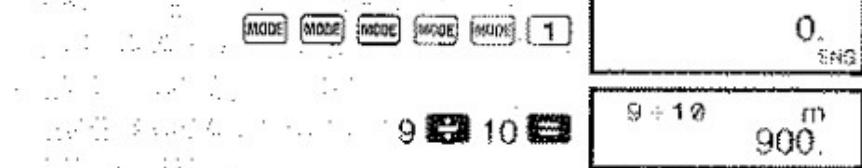
In the ENG mode, even standard (non-ENG) calculation results are displayed using ENG symbols

[SHIFT] [ENG]	0.9

[ENG]	9 ÷ 10 m 900.
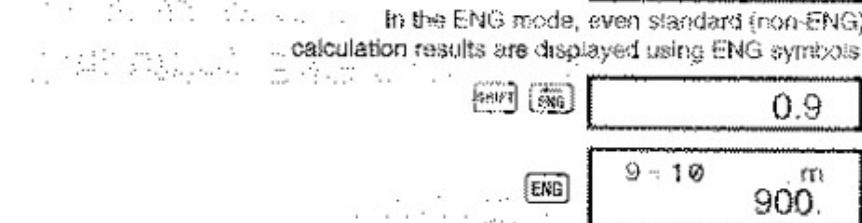
■ Coordinate Conversion (Pol(x, y), Rec (r, θ))

• Calculation results are automatically assigned to variables E and F.

• **Example 1:** To convert polar coordinates ($r=2$, $\theta=60°$) to rectangular coordinates (x, y) (DEG mode)

x	[SHIFT] [Rec] 2 [,] 60 [)] [=]	1. E

y	[RCL] [F]	1.732050808
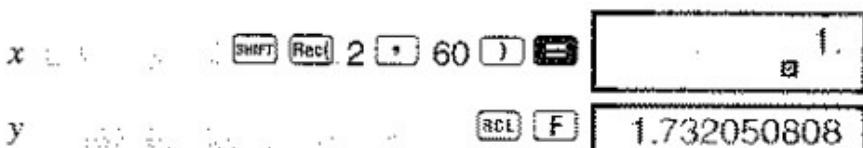
• [RCL] [E], [RCL] [F] swaps displayed value with value in memory.

• **Example 2:** To convert rectangular coordinates ($1, \sqrt{3}$) to polar coordinates (r, θ) (RAD mode)

r	[SHIFT] [Pol] 1 [,] [√] 3 [)] [=]	2. E

θ [RCL] [F] [1.047197551]

- [RCL] [F], [RCL] [F] swaps displayed value with value in memory.

■ Permutation

- **Example:** To determine how many different 4-digit values can be produced using the numbers 1 through 7
  - Numbers cannot be duplicated within the same 4-digit value (1234 is allowed, but 1123 is not).

       7 [SHIFT] [nPr] 4 [=] [840.]

■ Combination

- **Example:** To determine how many different 4-member groups can be organized in a group of 10 individuals

       10 [SHIFT] [nCr] 4 [=] [210.]

Statistical Calculations

■ Standard Deviation (SD Mode)

- Press [MODE] [MODE] [1] to enter the SD Mode for statistical calculations using standard deviation.
- Data input always starts with [SHIFT] [Scl] [=] to clear statistical memory.
- Input data is used to calculate values for n, Σx, Σx^2, $\bar{x}$, σn and σn-1 which you can recall using the key operations noted nearby.

[RCL] [A]		Σx^2
[RCL] [B]		Σx
[RCL] [C]		n
[SHIFT] [$\bar{x}$]		$\bar{x}$
[SHIFT] [xσn]		σn
[SHIFT] [xσn-1]		σn-1

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- **Example:** To calculate σ_{n-1}, σ_n, $\bar{x}$, n, Σx, and Σx^2 for the following data : 55, 54, 51, 55, 53, 53, 54, 52

Enter SD Mode [MODE] [MODE] [1]

[SHIFT] [Scl] [=] (Memory Clear)

55 [DT] 54 [DT] 51 [DT] 55 [DT]
53 [DT] [DT] 54 [DT] 52 [DT]

		52.
		50

(Sample Standard Deviation σ_{n-1})	[SHIFT] [xσ_{n-1}] [=]	1.407885953
(Population Standard Deviation σ_n)	[SHIFT] [xσ_n] [=]	1.316956719
(Arithmetic Mean $\bar{x}$)	[SHIFT] [$\bar{x}$] [=]	53.375
(Number of Data n)	[RCL] [C]	8.
(Sum of Values Σx)	[RCL] [B]	427.
(Sum of Squares of Values Σx^2)	[RCL] [A]	22805.

Data Input Precautions

- [DT] [DT] inputs the same data twice.
- You can also input multiple entries of the same data using [SHIFT] [;]. To input the data 110 ten times, for example, press 110 [SHIFT] [;] 10 [DT].
- The above results can be obtained in any order, and not necessarily that shown above.
- To delete data you have just input, press [SHIFT] [CL].

■ Probability Distribution Calculations

- Press [SHIFT] [DISTR] to produce the screen shown below.

```
P( Q( R( →t
 1  2  3  4
```

- Input a value from [1] to [4] to select the probability distribution calculation you want to perform.

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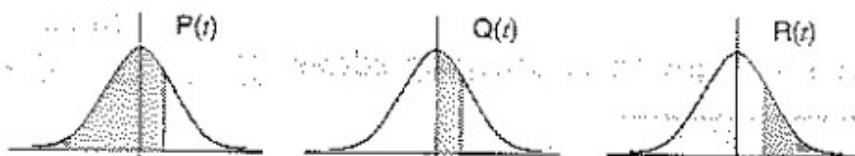
• **Example** : Using the x-data values input in the example
on page 20, determine the normalized variate ($\rightarrow t$) for
$x = 53$ and normal probability distribution P(t).

53 [BASE] [DISTR] [4] ($\rightarrow t$) [=] $\boxed{-0.284747398}$

[SHIFT] [DISTR] [1] (P() -0.28 [)] [=] $\boxed{0.38974}$

■ Regression Calculations (REG Mode)

• Press [MODE] [MODE] [2] to enter the REG mode and then se-
lect one of the following regression types:
   - [1]: Linear regression
   - [2]: Logarithmic regression
   - [3]: Exponential regression
   - [▶] [1]: Power regression
   - [▶] [2]: Inverse regression
   - [▶] [3]: Quadratic regression
• Data input always starts with [SHIFT] [Scl] [=] to clear statisti-
cal memory.
• The values produced by a regression calculation depend
on the values input, and results can be recalled using
the key operations shown in the table below.

[RCL] [A]	Σx^2	[SHIFT] [$x\sigma_n$]	$x\sigma_{n-1}$	
[RCL] [B]	Σx	[SHIFT] [$\bar{y}$]	$\bar{y}$	
[RCL] [C]	n	[SHIFT] [$y\sigma_n$]	$y\sigma_n$	
[RCL] [D]	Σy^2	[SHIFT] [$y\sigma_{n-1}$]	$y\sigma_{n-1}$	
[RCL] [E]	Σy	[SHIFT] [A]	Regression coefficient A	
[RCL] [F]	Σxy	[SHIFT] [B]	Regression coefficient B	
[RCL] [M]	Σx^3	[SHIFT] [C]	Regression coefficient C	
[RCL] [X]	$\Sigma x^2 y$	[SHIFT] [r]	Correlation coefficient r	
[RCL] [Y]	Σx^4	[SHIFT] [$\hat{x}$]	$\hat{x}$	
[SHIFT] [$\bar{x}$]	$\bar{x}$	[SHIFT] [$\hat{y}$]	$\hat{y}$	
[SHIFT] [$x\sigma_n$]	$x\sigma_n$			

• Linear Regression

The regression formula for linear regression is: $y = A + Bx$.

• Example: Atmospheric Pressure vs. Temperature

Temperature	Atmospheric Pressure
10°C	1003 hPa
15°C	1005 hPa
20°C	1010 hPa
25°C	1011 hPa
30°C	1014 hPa

Perform linear regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate atmospheric pressure at 18°C and temperature at 1000 hPa.

Enter REG Mode (Linear Regression)

[MODE] [MODE] [2] [1]

[SHIFT] [Scl] [=] (Memory Clear)

10 [·] 1003 [DT] 15 [·] 1005 [DT]

20 [·] 1010 [DT] 25 [·] 1011 [DT]

30 [·] 1014 [DT]

	30.
	REG

(Regression Coefficient A) [SHIFT] [A] [=]

997.4

(Regression Coefficient B) [SHIFT] [B] [=]

0.56

(Correlation Coefficient r) [SHIFT] [r] [=]

0.982607368

(Atmospheric Pressure at 18°C) 18 [SHIFT] [ŷ]

1007.48

(Temperature at 1000 hPa) 1000 [SHIFT] [x̂]

4.642857143

• Quadratic Regression

- The regression formula for quadratic regression is:
  $y = A + Bx + Cx^2$.
- Input data using the following key sequence.
  <x-data> [·] <y-data> [DT]

• Example:

x_i	y_i
29	1.6
50	23.5
74	38.0
103	46.4
118	48.0

Perform quadratic regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate the values for $\hat{y}$ (estimated value of y) for $x_i = 16$ and $\hat{x}$ (estimated value of x) for $y_i = 20$.

Enter REG mode (Quadratic regression)

`MODE` `MODE` `2` `▶` `3`
`SHIFT` `Scl` `=`

29 `.` 1.6 `DT` 50 `.` 23.5 `DT`
74 `.` 38.0 `DT` 103 `.` 46.4 `DT`
118 `.` 48.0 `DT`

	118.
	REG

(Regression Coefficient A)	`SHIFT` `A` `=`	−35.59856934
(Regression Coefficient B)	`SHIFT` `B` `=`	1.495939413
(Regression Coefficient C)	`SHIFT` `C` `=`	−6.71629667−03
($\hat{y}$ when $xi = 16$)	16 `SHIFT` `ŷ`	−13.38291067
($\hat{x}_1$ when $yi = 20$)	20 `SHIFT` `x̂`	47.14556728
($\hat{x}_2$ when $yi = 20$)	`SHIFT` `x̂`	175.5872105

Data Input Precautions

- `DT` `DT` inputs the same data twice.
- You can also input multiple entries of the same data using `SHIFT` `;`. To input the data "20 and 30" five times, for example, press 20 `.` 30 `SHIFT` `;` 5 `DT`.
- The above results can be obtained in any order, and not necessarily that shown above.
- To delete data you have just input, press `SHIFT` `CL`.

Complex Number Calculations (CMPLX Mode)

- Press `MODE` `2` to enter the CMPLX Mode for calculations that include complex numbers.
- You can use variables A, B, C and M only. Variables D, E, F, X, and Y are used for storage of the imaginary parts of values and so cannot be used by you.

•23•

- **Example:** $(2 + 3i) + (4 + 5i)$

  Enter CMPLX Mode [MODE] [2]

  [( ] 2 [+] 3 [i] [ )] [+]
  [( ] 4 [+] 5 [i] [ )] [=]

  | 6. |
  Real number part

  [SHIFT] [Re↔Im] | 8.i |
  Imaginary number part
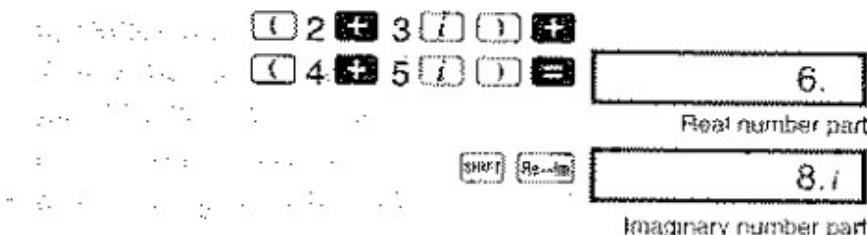
■ Absolute Value/Argument Calculation

- The procedure described below can be used to determine the absolute value (Abs) and argument (arg) for a complex number of the format $Z = a + bi$, which is presumed to exist as coordinates on a Gaussian plane.

- **Example:** To obtain the absolute value (r) and argument (θ) for the complex number $3 + 4i$, when DEG is set for the angle unit mode

Imaginary number axis

Real number axis

Determine the absolute value.

[SHIFT] [Abs] [( ] 3 [+] 4 [i] [ )] [=] | 5. |
CMPLX

Determine the argument.

[SHIFT] [arg] [( ] 3 [+] 4 [i] [ )] [=] | 53.13010235 |
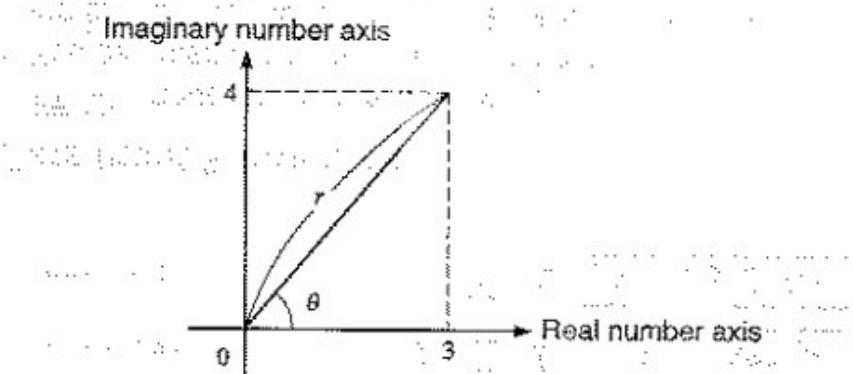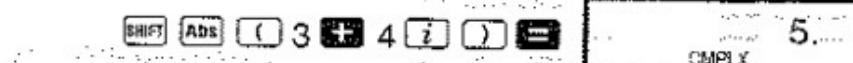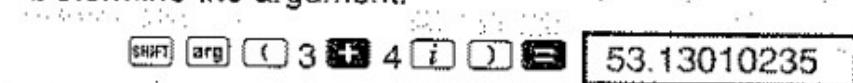
Formula Memory

- Formula memory lets you input a single formula in memory, and then input values for the formula's variables to calculate results.

•24•

- Memory can hold a single formula, up to 79 steps long. This function can be used in the COMP or CMPLX mode only.
- Note that the formula is actually stored in memory when you press the [CALC] key in the sequence below.
- **Example:** To save the following formula, recall it, and then use it to calculate a result: $Y = X^2 + 3X - 12$

Input the formula.

[ALPHA] [Y] [ALPHA] [=] [ALPHA] [X] [x²] [+]
3 [ALPHA] [X] [−] 12

$Y=X^2+3X-12\_$
0.

Store it in memory.   [CALC]

X?
0.

Input a value for its variable.   7 [=]

58.

[=]

X?
7.

8 [=]

76.

- Formula memory is cleared whenever you start a new calculation, change to another mode, or turn off power.

Metric Conversions (fx-570W/fx-991W)

- A total of 20 different conversion pairs are built-in to provide quick and easy conversion to and from metric units.
- See the Conversion Pair Table on page 26 for a complete list of available conversion pairs.
- **Example:** To convert 31 inches to centimeters

31 [SHIFT] [CONV]

CONV__

.01

CONV01

01 is the inches-to-centimeters conversion pair number.

31 in → cm_
0.

[=]

31 in → cm
78.74

• Conversion Pair Table

Based on ISO Standard (1992) data and CODATA Bulletin 63 (1986) data.

Number	Conversion Pair	Number	Conversion Pair
01	in → cm	21	oz → g
02	cm → in	22	g → oz
03	ft → m	23	lb → kg
04	m → ft	24	kg → lb
05	yd → m	25	atm → Pa
06	m → yd	26	Pa → atm
07	mile → km	27	mmHg → Pa
08	km → mile	28	Pa → mmHg
09	n mile → m	29	hp → kW
10	m → n mile	30	kW → hp
11	acre → m^2	31	kgf/cm^2 → Pa
12	m^2 → acre	32	Pa → kgf/cm^2
13	gal (US) → ℓ	33	kgf•m → J
14	ℓ → gal (US)	34	J → kgf•m
15	gal (UK) → ℓ	35	lbf/in^2 → kPa
16	ℓ → gal (UK)	36	kPa → lbf/in^2
17	pc → km	37	°F → °C
18	km → pc	38	°C → °F
19	km/h → m/s	39	J → cal
20	m/s → km/h	40	cal → J

Scientific Constants (fx-570W/fx-991W)

- A total of 40 commonly-used scientific constants, such as the speed of light in a vacuum and Planck's constant are built-in for quick and easy lookup whenever you need them.
- Simply input the number that corresponds to the scientific constant you want to look up and it appears instantly on the display.
- See the Scientific Constant Table on pages 27 and 28 for a complete list of available constants.

- **Example:** To determine how much total energy a person weighing 65kg has ($E = mc^2$)

65 [CONST]		CONST___

28		CONST28

28 is the "speed of light in vacuum" constant number.

	65Co_ 0.

$[x^2]$	65Co² _ 0.

▀	65Co³ 5.841908662 ¹⁸

• Scientific Constant Table

Based on ISO Standard (1992) data and CODATA Bulletin 63 (1986) data.

Number	Constant Name	Symbol
01	proton mass	m_p
02	neutron mass	m_n
03	electron mass	m_e
04	muon mass	$m\mu$
05	Bohr radius	a_0
06	Planck's constant	h
07	nuclear magneton	μN
08	Bohr magneton	μB
09	Planck's constant, rationalized (h-bar)	$\hbar$
10	fine-structure constant	α
11	classical electron radius	r_e
12	electron Compton wavelength	λc
13	proton gyromagnetic ratio	γp
14	proton Compton wavelength	λcp
15	neutron Compton wavelength	λcn
16	Rydberg constant	R_∞
17	atomic mass unit	u
18	proton magnetic moment	μp
19	electron magnetic moment	μe
20	neutron magnetic moment	μn
21	muon magnetic moment	$\mu\mu$
22	Faraday constant	F

Number	Constant Name	Symbol
23	elementary charge	e
24	Avogadro constant	NA
25	Boltzmann constant	k
26	molar volume of ideal gas	Vm
27	molar gas constant	R
28	speed of light in vacuum	C_0
29	first radiation constant	C_1
30	second radiation constant	C_2
31	Stefan-Boltzmann constant	σ
32	permittivity of vacuum	ε_0
33	permeability of vacuum	μ_0
34	magnetic flux quantum	ϕ_0
35	standard acceleration of gravity	g
36	astronomical unit	AU
37	parsec	pc
38	Celsius temperature	t
39	Newtonian constant of gravitation	G
40	standard atmosphere	atm

Base-*n* Calculations

- In addition to decimal values, calculations can be performed using binary, octal and hexadecimal values.
- You can specify the default number system to be applied to all input and displayed values, and the number system for individual values you input.
- You cannot use scientific functions in binary, octal, decimal, and hexadecimal calculations. You cannot input values that include decimal part and an exponent.
- If you input a value that includes a decimal part, the unit automatically cuts off the decimal part.
- Negative binary, octal, and hexadecimal values are produced by taking the two's complement.
- You can use the following logical operators between values in Base-*n* calculations: and (logical product), or (logical sum), xor (exclusive logical sum), xnor (exclusive logical sum negation), Not (negation), and Neg (minus).

- The following are the allowable ranges for each of the available number systems.

Binary	$1000000000 \leq x \leq 1111111111$
	$0 \leq x \leq 0111111111$
Octal	$4000000000 \leq x \leq 7777777777$
	$0 \leq x \leq 3777777777$
Decimal	$-2147483648 \leq x \leq 2147483647$
Hexadecimal	$80000000 \leq x \leq FFFFFFFF$
	$0 \leq x \leq 7FFFFFFF$

- **Example 1:** To perform the following calculation and produce a binary result:

$10111_2 + 11010_2$
Binary mode   [MODE] [MODE] [3] [BIN] | 0. ᵇ |

     10111_2 [＋] 11010_2 | 0. ᵇ |

     [＝] | 110001. ᵇ |
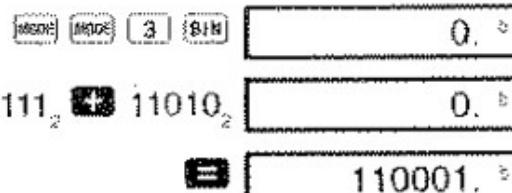
- **Example 2:** To perform the following calculation and produce an octal result:

$7654_8 \div 12_{10}$
Octal mode   [MODE] [MODE] [3] [OCT] | 0. ° |

     [LOGIC] [LOGIC] [LOGIC] [4] (o) 7654_8 [÷] | 0. ° |

     [LOGIC] [LOGIC] [LOGIC] [1] (d) 12_{10} | 0. ° |

     [＝] | 516. ° |
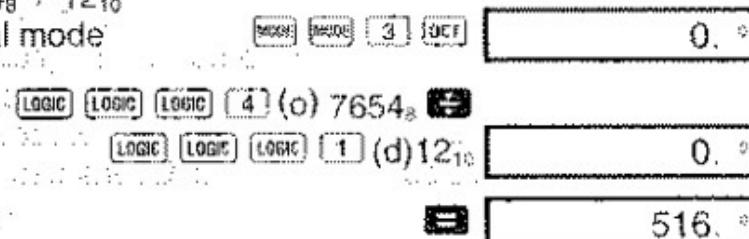
- **Example 3:** To perform the following calculation and produce a hexadecimal result:

120_{16} or 1101_2
Hexadecimal mode   [MODE] [MODE] [3] [HEX] | 0. ᴴ |

     120_{16} [LOGIC] [2] (or) | 0. ᴴ |
     [LOGIC] [LOGIC] [LOGIC] [3] (b) 1101_2 | 0. ᴴ |

     [＝] | 12d. ᴴ |
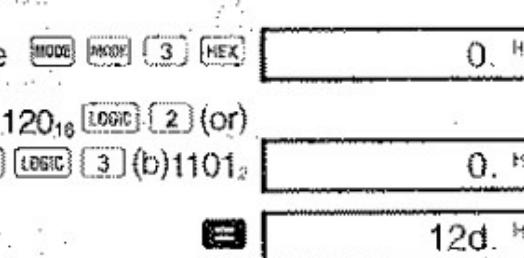
Integration Calculations

- The following four inputs are required for integration calculations: a function with the variable x; a and b, which define the integration range of the definite integral; and n, which is the number of partitions (equivalent to $N = 2^n$) for integration using Simpson's rule.

  $\boxed{dx}$ expression $\square$ a $\square$ b $\square$ n $\square$

- Use the COMP mode for integration calculations.

- **Example:** To calculate: $\int_1^5 (2x^2 + 3x + 8)\, dx$

  $\boxed{dx}$ 2 $\boxed{\text{ALPHA}}$ $\boxed{X}$ $\boxed{x^2}$ $\blacksquare$ 3 $\boxed{\text{ALPHA}}$ $\boxed{X}$ $\blacksquare$

  $8 \square 1 \square 5 \square 6 \square$ | 0.

  $\blacksquare$ | 150.6666667
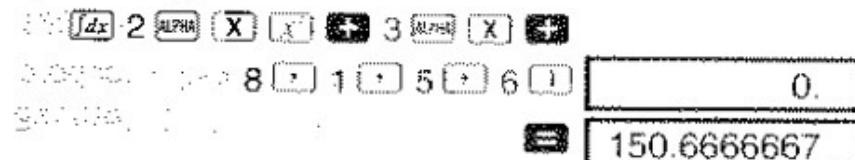
Note!

- You can specify an integer in the range of 1 to 9 as the number of partitions, or you can skip input of the number of partitions entirely, of you want.
- Internal integration calculations may take considerable time to complete.
- Display contents are cleared while an integration calculation is being performed internally.

Degrees, Minutes, Seconds Calculations

- You can perform sexagesimal calculations using degrees (hours), minutes, and seconds, and convert between sexagesimal and decimal values.

- **Example 1:** To convert the decimal value 2.258 to a sexagesimal value

  2.258 $\blacksquare$ | 2.258

  $\boxed{\text{Shift}}$ $\boxed{\cdots}$ | 2°15°28.8
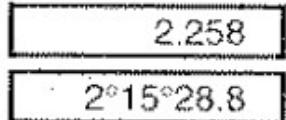
- **Example 2:** To perform the following calculation:

  12°34'56" × 3.45

  12 $\boxed{\cdots}$ 34 $\boxed{\cdots}$ 56 $\boxed{\cdots}$ $\boxed{\times}$ 3.45 | 0.

  $\blacksquare$ | 43°24°31.2
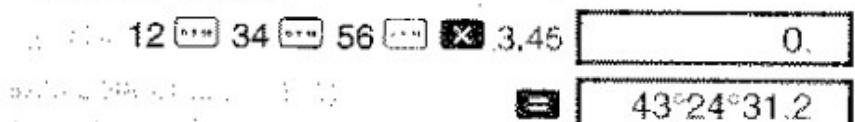
■ When you have a problem......

If calculation results are not what you expect or if an error occurs, perform the following steps.

1. [MODE] [1] (COMP mode)
2. [MODE] [MODE] [MODE] [1] (DEG mode)
3. [MODE] [MODE] [MODE] [MODE] [3] [1] (NORM 1 mode)
4. Check the formula you are working with to confirm it is correct.
5. Enter the correct modes to perform the calculation and try again.

< fx-570W/fx-100W >

If the above steps do not correct your problem, press the P button (see page 35 or 36) on the back of the calculator to reset it. Pressing the P button deletes all data stored in calculator memory. Make sure you always keep written copies of all important data.

< fx-991W/fx-115W >

If the above steps do not correct the problem, press the [ON] key. The calculator performs a self-check operation and deletes all data stored in memory if any abnormality is detected. Make sure you always keep written copies of all important data.

■ Error Messages

The calculator is locked up while an error message is on the display. Press [AC] to clear the error, or press [◀] or [▶] to display the calculation and correct the problem. See "Error Locator" on page 10 for details.

Ma ERROR

- **Cause**
  - Calculation result is outside the allowable calculation range.
  - Attempt to perform a function calculation using a value that exceeds the allowable input range.

- Attempt to perform an illogical operation (division by zero, etc.).
- **Action**
  - Check your input values and make sure they are all within the allowable ranges. Pay special attention to values in any memory areas you are using.

Stk ERROR

- **Cause**
  - Capacity of the numeric stack or operator stack is exceeded.
- **Action**
  - Simplify the calculation. The numeric stack has 10 levels and the operator stack has 24 levels.
  - Divide your calculation into two or more separate parts.

Syn ERROR

- **Cause**
  - Attempt to perform an illegal mathematical operation.
- **Action**
  - Press ◀ or ▶ to display the calculation with the cursor located at the location of the error. Make necessary corrections.

Arg ERROR

- **Cause**
  - Improper use of argument
- **Action**
  - Press ◀ or ▶ to display the location of the cause of the error and make required corrections.

■ Order of Operations

Calculations are performed in the following order of precedence.

① Coordinate transformation: Pol (x, y), Rec (r, θ)
   Integrations: $\int dx$
② Type A functions:
   With these functions, the value is entered and then the function key is pressed.
   $x^2, x^{-1}, x!, \circ \prime \prime$
③ Powers and roots: $x^y, \sqrt[x]{\ }$

④ a^b/c

⑤ Abbreviated multiplication format in front of π, memory name, or variable name: 2π, 5A, πA 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, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$, $(-)$

⑦ Abbreviated multiplication format in front of Type B functions: $2\sqrt{3}$, Alog2 etc.

⑧ Permutation and combination: nPr, nCr

⑨ ×, ÷

⑩ +, −

* Operations of the same precedence are performed from right to left. $e^x \ln \sqrt{} 120 \rightarrow e^x\{\ln(\sqrt{} 120)\}$
Other operations are performed from left to right.

* Operations enclosed in parentheses are performed first.

■ Stacks

This calculator uses memory areas, called "stacks," to temporarily store values (numeric stack) and commands (command stack) according to their precedence during calculations. The numeric stack has 10 levels and the command stack has 24 levels. A stack error (Stk ERROR) occurs whenever you try to perform a calculation that is so complex that the capacity of a stack is exceeded.

■ Power Supply

The type of battery you should use depends on the model number of your calculator.

\<fx-991W/fx-115W\>

The TWO WAY POWER system actually has two power supplies: a solar cell and a G13 Type (LR44) button battery. Normally, calculators equipped with a solar cell alone can operate only when relatively bright light is present. The TWO WAY POWER system, however, lets you continue to use the calculator as long as there is enough light to read the display.

• Replacing the Battery

Either of the following symptoms indicates battery power is low, and that the battery should be replaced.
- Display figures are dim and difficult to read in areas where there is little light available.
- Nothing appears on the display when you press the [ON] key.

• To replace the battery

① Remove the six screws that hold the back cover in place and then remove the back cover.

② Remove the old battery.

③ Wipe off the sides of new battery with a dry, soft cloth. Load it into the unit with the positive ⊕ side facing up (so you can see it).

④ Replace the back cover and secure it in place with the six screws.

⑤ Press [ON] to turn power on. Be sure not to skip this step.

Screw   Screw

< fx-570W >
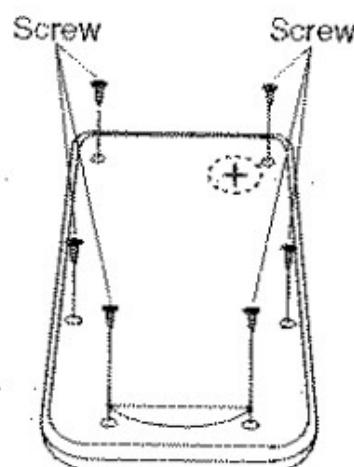
This calculator is powered by single G13 Type (LR44) button battery.

• Replacing the Battery

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 become dim.

• To replace the battery

① Press OFF to turn power off.

② Remove the two screws that hold the battery cover in place and then remove the battery cover.

③ Remove the old battery.

④ Wipe off the side of new battery with a dry, soft cloth. Load it into the unit with the positive ⊕ side facing up (so you can see it).

⑤ Replace the battery cover and secure it in place with the two screws.

⑥ Use a thin, pointed object to press the P button. Be sure not to skip this step.

⑦ Press AC⊕ to turn power on.
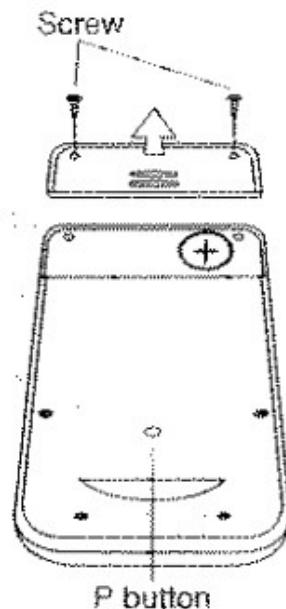
This calculator is powered by single AA-size battery.

• Replacing the Battery

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 become dim.

• To replace the battery

① Press [OFF] to turn power off.

② Remove the six screws that hold the back cover in place and then remove the back cover.

③ Remove the old battery.

④ Load a new battery into the unit so it's positive ⊕ and negative ⊖ sides are facing correctly.

⑤ Replace the back cover and secure it in place with the six screws.

⑥ Use a thin, pointed object to press the P button. Be sure not to skip this step.

⑦ Press [AC] to turn power on.

Screw   Screw

P button
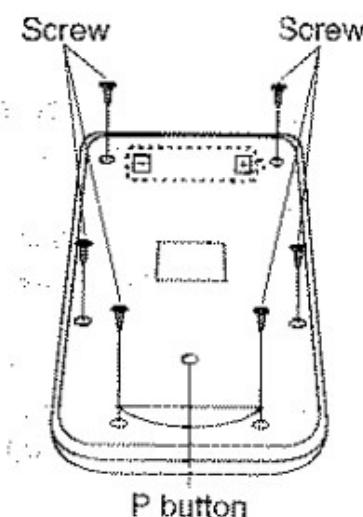
• Auto Power Off

Calculator power automatically turns off if you do not perform any operation for about six minutes. When this happens, press [AC] (fx-991W/fx-115W: [ON]) to turn power back on.

■ Input Ranges

Internal digits: 12
Accuracy: As a rule, accuracy is ±1 at the 10th digit.

Functions		Input Range
$\sin x$	DEG	$0 \leqq |x| \leqq 4.499999999 \times 10^{10}$
	RAD	$0 \leqq |x| \leqq 785398163.3$
	GRA	$0 \leqq |x| \leqq 4.499999999 \times 10^{10}$
$\cos x$	DEG	$0 \leqq |x| \leqq 4.500000008 \times 10^{10}$
	RAD	$0 \leqq |x| \leqq 785398164.9$
	GRA	$0 \leqq |x| \leqq 5.000000009 \times 10^{10}$
$\tan x$	DEG	Same as $\sin x$, except when $|x| = (2n-1) \times 90$.
	RAD	Same as $\sin x$, except when $|x| = (2n-1) \times \pi/2$.
	GRA	Same as $\sin x$, except when $|x| = (2n-1) \times 100$.
$\sin^{-1} x$ $\cos^{-1} x$		$0 \leqq |x| \leqq 1$
$\tan^{-1} x$		$0 \leqq |x| \leqq 9.999999999 \times 10^{99}$
$\sinh x$ $\cosh x$		$0 \leqq |x| \leqq 230.2585092$
$\sinh^{-1} x$ $\cosh^{-1} x$		$0 \leqq |x| \leqq 4.999999999 \times 10^{99}$
$\tanh x$ $\tanh^{-1} x$		$0 \leqq |x| \leqq 9.999999999 \times 10^{-1}$
$\log x / \ln x$		$0 < x$
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		$|x| < 1 \times 10^{50}$
$1/x$		$|x| < 1 \times 10^{100}; x \neq 0$
$\sqrt[3]{x}$		$|x| < 1 \times 10^{100}$
$x!$		$0 \leqq x \leqq 69$ (x is an integer)

Functions	Input Range
nPr	$0 \leqq n \leqq 99$, $r \leqq n$ (n, r is an integer) $1 \leqq \{n!/(n-r)!\} \leqq 9.999999999 \times 10^{99}$
nCr	$0 \leqq n \leqq 99$, $r \leqq n$ (n, r is an integer)
$\text{Pol}(x, y)$	$|x|$, $|y| \leqq 9.999999999 \times 10^{49}$ $(x^2 + y^2) \leqq 9.999999999 \times 10^{99}$
$\text{Rec}(r, \theta)$	$0 \leqq r \leqq 9.999999999 \times 10^{99}$ θ: Same as $\sin x$, $\cos x$
 $\circ' ''$ 	$|a|$, b, $c < 1 \times 10^{100}$ $0 \leqq b$, c
 $\overleftrightarrow{\circ' ''}$ 	$|x| < 1 \times 10^{100}$ Decimal $\leftrightarrow$ Sexagesimal Conversions $0°0°0° \leqq |x| \leqq 999999°59°$
 x^y 	$x > 0$: $-1 \times 10^{100} < y\log x < 100$ $x = 0$: $y > 0$ $x < 0$: $y = n$, $\dfrac{1}{2n+1}$ (n is an integer) However: $-1 \times 10^{100} < y\log|x| < 100$
 $\sqrt[x]{y}$ 	$y > 0$: $x \neq 0$ $-1 \times 10^{100} < 1/x \log y < 100$ $y = 0$: $x > 0$ $y < 0$: $x = 2n+1$, $\dfrac{1}{n}$ ($n \neq 0$; n is an integer) However: $-1 \times 10^{100} < 1/x \log|y| < 100$
a^b/c	Total of integer, numerator, and denominator must be 10 digits or less (including division marks).
SD (REG)	$|x| < 1 \times 10^{50}$ $|y| < 1 \times 10^{50}$ $|n| < 1 \times 10^{100}$ $x\sigma_n$, $y\sigma_n$, $\bar{x}$, $\bar{y}$ A, B, r: $n \neq 0$ $x\sigma_{n-1}$, $y\sigma_{n-1}$: $n \neq 0$, 1

* Erros are cumulative with such internal continuous calculations as x^y, $\sqrt[x]{}$, $x!$, and $\sqrt[3]{x}$, so accuracy may be adversely affected.

Power Supply:

 fx-100W: Single AA-size battery (R6P (SUM-3))

 fx-570W: Single G13 Type button battery (LR44)

 fx-115W/fx-991W:

    Solar cell and a single G13 Type button battery (LR44)

Battery Life:

 fx-100W: Approximately 17,000 hours continuous display of flashing cursor.

    Approximately 2 years when left with power turned off.

 fx-570W: Approximately 12,000 hours continuous display of flashing cursor.

    Approximately 3 years when left with power turned off.

 fx-115W/fx-991W:

    Approximately 3 years (1 hour use per day).

Dimensions:

 fx-100W: 19.2(H)×76(W)×164(D) mm

    $3/4"$(H)×3"(W)×$6^{7}/16"$(D)

 fx-115W/fx-570W/fx-991W:

    10(H)×76(W)×150(D) mm

    $3/8"$(H)×3"(W)×$5^{7}/8"$(D)

Weight:

 fx-100W: 114 g (4 oz) including battery

 fx-115W/fx-570W/fx-991W: 85 g (3 oz) including battery

Power Consumption: 0.0001W

Operating Temperature: 0°C ~ 40°C (32°F ~ 104°F)