Canon

F-605G

Scientific Calculator

INSTRUCTION

ENGLISH

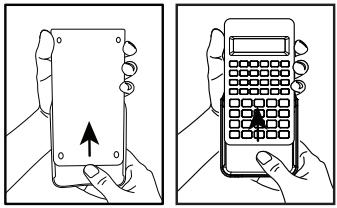
CONTENTS

IMPORTANT: READ BEFORE USE

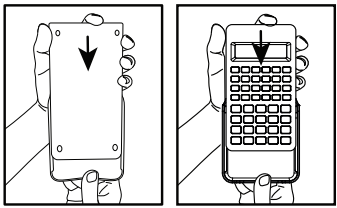
Please read the following instructions and safety precautions before using the Scientific Calculator. Keep this manual on hand for future reference.

HOW TO OPEN / CLOSE THE COVER

Open or close the cover by sliding as shown in the figures.

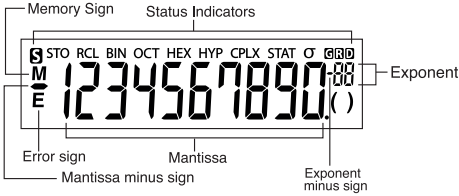


OPEN



CLOSE

DISPLAY

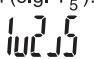


S	:	Shift Key
STO	:	Store Memory
RCL	:	Recall Memory
BIN	:	Binary Mode
OCT	:	Octal Mode
HEX	:	Hexadecimal Mode
HYP	:	Hyperbolic
CPLX	:	Complex Mode
STAT	:	Statistics Mode
σ	:	Standard Deviation of Population
G	:	Gradient Mode
D	:	Degree Mode
R	:	Radian Mode

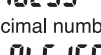
Note: For possible errors, see page 25 "Errors".

Examples:

Fraction (e.g. $1\frac{2}{5}$):



Hexadecimal numbers A ~ F:



GETTING STARTED

1. Check the Current Calculation Mode

Be sure to check the status indicators that indicate the current calculation mode (DEG, BIN, STAT and CPLX) and display formats setting (Floating mode).

Note! If you get into trouble, hold SHIFT + • RESET to reset the calculator.

2. Key Symbols

Example (sin⁻¹ D sin):

sin To use a function printed on a key, press the key.

sin⁻¹ To use a function printed above a key, press the SHIFT key while in decimal mode.

D The "D" key is colored in gray.
To use a function printed above a key in gray, press the SHIFT key while in Hexadecimal mode.

Note:
The blue keys are active in Statistic mode only. In Statistic mode ("STAT" indicator lights up), they work as follows.

Example (n Σx1 ( ):

n Calculate the number of data samples when it is pressed.

Σx1 **2nd function key**: Calculate the summation of " Σx " data were input when it is pressed immediately after SHIFT .

Power ON, OFF

■ **First time operation:**

1. Pull out the battery insulation sheet, then the battery will be loaded and the calculator can be powered on.
2. Hold SHIFT + •RESET to reset the calculator.

ON/CA **Power ON/Clear Key:** Turns the calculator on. When power is turned on, all registers except the memory registers are cleared.

SHIFT + OFF **Power OFF Key:** Turns the calculator off.

CE **Clear Entry Key:** Clears the content just entered.

SHIFT + •RESET **Reset Key:** Reset the calculator when these keys are pressed. The memory is cleared, and the calculation mode is reset to Decimal Calculation (Floating mode).

Auto Power Off Function

When the calculator is not used for about 7 minutes, the calculator will automatically power off.

Numeric Entry and Mode Selection Keys

[0] ~ [9] **Numeric Keys:** Enters numbers.

[▪] **Decimal Point Key:** Enters a decimal point.

[EXP] **Exponential Key:** Uses to enter exponents.

Example: 35×10^{43} → [3] [5] [EXP] [4] [3] (35.^{43})

[(–)] **Sign Change Key:** For changing the sign (+ or –) of the displayed mantissa or exponents.

Example: 123 → [1] [2] [3] [(–)] (–123.)

[▶] **Backspace Key:** Clears the last digit entered and shifts any remaining digits one place to the right.

Example:

Value	Operation	Display
12345	[1] [2] [4] incorrect entry	124.
	[▶]	12.
	[3] [4] [5]	12345.

[SHIFT] **Shift Key:** For performing second functions indicated above the keys.

Example: $\sin^{-1}$ 0.5 → [▪] [5] [SHIFT] [$\sin^{-1}$] (30.)

Mode Selection

To specify the calculation mode:

Operation	Mode	Display Indicator
SHIFT ▶DEC	Decimal Calculation (Degree) Mode	D
SHIFT ▶BIN	Binary Calculation Mode	BIN
SHIFT ▶OCT	Octal Calculation Mode	OCT
SHIFT ▶HEX	Hexadecimal Calculation Mode	HEX
SHIFT STAT	Statistical Calculation Mode	STAT
SHIFT CPLX	Complex Number Calculation Mode	CPLX

Display Mode Keys

ENG : Engineering Exponential mode.

◀ENG : Return to previous mode from Engineering Exponential mode.

F↔S : Switch between Floating mode and Scientific Exponential mode.

Example:

Operation	Display	Explanation
	0.	Floating Mode
1 2 3 ×		
1 0 =	1230.	
F↔S	1.23^{03}	Scientific Exponential Mode
ENG	1.23^{03}	Engineering Exponential Mode
ENG	$1230.^{00}$	
ENG	$1230000.^{-03}$	
SHIFT ◀ENG	$1230.^{00}$	Reverse Engineering Exponential

Display Range:

Floating Mode

$10^{10} \leqq \|x\| < 10^{100}$	For exponential display
$10^{-99} \leqq \|x\| < 10^{-9}$	For exponential display
$x = 0$ or $10^{-9} \leqq \|x\| < 10^{10}$	For mantissa display

- Scientific Exponential Mode
  $x = 0$, and $10^{-99} \leqq |x| < 10^{100}$

- Engineering Exponential Mode
  $x = 0$, and $10^{-99} \leqq |x| < 10^{100}$
  Exponent: Multiple of 3

Decimal Point Selection Key

FIX Specify the number of decimal places in the mantissa of the decimal calculation results. Press [0] ~ [9] after SHIFT FIX to specify the number of decimal places.

Note! To reset the decimal places, press SHIFT , FIX , then [▪].

Example:

Operation	Display	Explanation
SHIFT FIX [3]	0.000	3 decimal places
[1] [2] [3]		
[4] [5] [6]		
[7] [8] [9]		
[×]	123456789.0	
[▪] [0] [0]		
[1] [=]	123456.789	
SHIFT FIX [0]	123457.(*1)	0 decimal places
SHIFT FIX [5]	123456.7890(*2)	5 decimal places
SHIFT FIX [▪]	123456.789	Reset decimal places

*1 The displayed value is rounded up within the specified range, but the actual calculation result is retained in the register.

*2 The number is displayed with left justification. In this case, 5 decimal places are specified, but only the 10 most significant digits are displayed. The 5th decimal place is not displayed.

Degree / Radian / Gradient Mode Key

DRG Change angle units.

SHIFT DRG▶ **Angle Unit Conversion Mode:** For converting angle values to different units. (DEG → RAD → GRAD)

• Relationship of units: $200^{GRAD} = 180^{\circ} = \pi^{RAD}$

Example (in Degree mode):

1 8 0 SHIFT DRG▶ (3.141592654 R)

Basic Calculation Keys

[+] [−] [×] [÷] [=] **Arithmetic Keys:** Uses for basic arithmetic calculation.

[%] **Percent key:** Uses for percentage, add-on and discount calculations.

Example: [1] [2] [3] [SHIFT] [%] (1.23)

[(] [)] **Open, Close Parenthesis Keys**

Example:

Value	Operation	Display
2 × (3 + 4) = 14	[2] [×] [(] [3] [+] [4] [)] [=]	14.
1 + [(4 − 3.6 + 5) × 0.8 − 6] × 4.2 = − 6.056	[1] [+] [(] [(] [4] [−] [3] [.] [6] [+] [5] [)] [×] [.] [8] [−] [6] [)] [×] [4] [.] [2] [=]	− 6.056

- Up to 15 consecutive open parentheses can be used at one time.
  Example: 5 × (((. . . ((4 + 2) × 3) + 8 . . .
  Up to 15 parentheses
- [(] and [)] are always used together. If either key is pressed alone during an operation, the intended result cannot be obtained.
- [(] key is effective only when pressed immediately after a calculation instruction.
- When [(] is effective, "0" will be displayed. Parentheses indicators ( ) appear on the display.

Fraction Calculation Keys

[a b/c] **Fraction Key:** Use this key to enter both mixed and improper fractions.

$\frac{d}{c}$: d (numerator) → [a b/c] → c (denominator).

$a\frac{b}{c}$: a (integer) → [a b/c] → b (numerator) → [a b/c] → c (denominator)

■ The fraction $\frac{2}{3}$ is displayed as "2⌟3", and $1\frac{2}{5}$ as "1␣2⌟5".

Example:

Value	Operation	Display
$\frac{2}{3}$	[2]	2.
	[a b/c]	2⌟.
	[3]	2⌟3.
$1\frac{2}{5}$	[1]	1.
	[a b/c]	1⌟.
	[2]	1⌟2.
	[a b/c]	1␣2⌟.
	[5]	1␣2⌟5.

Note!

- Fraction calculation results will be displayed in decimal format automatically whenever the total digits of a fractional value (integer + numerator + denominator + separator marks) exceeds 10.
- [a b/c] can convert the results of fractional calculations to decimal notation, and vice versa.

Example: Calculate $1\frac{2}{3} + 4\frac{5}{6}$ and convert the result to a decimal fraction.

Operation	Display
1 a b/c 2 a b/c 3 +	1 ⌴ 2 ⌟ 3.
4 a b/c 5 a b/c 6 =	6 ⌴ 1 ⌟ 2.
a b/c	6.5
a b/c	6 ⌴ 1 ⌟ 2.

SHIFT d/c

Mixed / Improper Fraction Conversion Key: It converts mixed fractions to improper fractions and vice versa. It changes alternatively each time the key is pressed.

Example: Enter $\frac{10}{3}$ and convert it to a mixed fraction.

Operation	Display
1 0 a b/c 3	10 ⌟ 3.
=	3 ⌴ 1 ⌟ 3.
SHIFT d/c	10 ⌟ 3.

Memory Keys

Independent Memory: The data in the independent memory is retained even when the calculator is turned off.

[M+] [M-] **Memory Plus and Minus Key:** Add or Substract numbers to the independent memory.

[MR] **Memory Recall Key:** Retrieve the value of the independent memory.

[X→M] **Exchange Memory By Display Value:** Replaces the displayed number with the contents of the independent memory.

Memory Variables: You can assign a specific value or a calculation result to a variable. There are 6 memory variables (A, B, C, D, E and F) to store data, results, or dedicated values.

[STO] **Store Values Key:** To store variable into memory.

[RCL] **Recall Values Key**: To recall the memory variable.

Example: Using the independent memory:

Operation	Display	Memory contents	Explanation
[1] [2] [3]	123.	0	Enter 123
[M+]	M 123.	123	Store 123
[4] [5] [6] [M+]	M 456.	579	Add 456
[MR]	M 579.	579	Recall from memory
[7] [8] [9]	M 789.	579	Enter 789
[X→M]	M 789.	789	Replace memory with display
[ON CA]	M 0.	789	Clear display
[X→M]	0.	0	Clear memory

Example: Using the memory variable

Operation	Display	Memory contents	Explanation
1 2 × 3 =	36.	0	Enter value
SHIFT STO A	36.	36	Store value to variable A
4 5 + 6 =	51.	0	Enter value
SHIFT STO C	51.	51	Store value to variable C
ON CA	0.	A= 36 C= 51	Clear display
RCL A	36.	36	Recall the contents of variable A
RCL C	51.	51	Recall the contents of variable C

Binary / Octal / Hexadecimal Number Keys

SHIFT + ▶DEC / ▶BIN / ▶OCT / ▶HEX : To specify the numbering system as Decimal / Binary / Octal / Hexadecimal.

Binary Number Entry Keys: 0 ~ 1
2 ~ 9 are ignored in Binary mode.

Octal Number Entry Keys: 0 ~ 7
8 and 9 are ignored in Octal mode.

Hexadecimal Number Entry Keys (0~9): 0 ~ 9

Hexadecimal Number Entry Keys (10~15):
A ~ F

Example:

Value	Operation	Display
	SHIFT ▶HEX	(HEX.)
AB7C	A B 7 C	Ab7C.

Random Number Generation

Rand **Random Key:** To generate a random number between 0.000 and 0.999.

* The value being generated will differ each time

Example: SHIFT Rand (0.132)*

Complex Number Calculation

SHIFT CPLX : To enter complex mode.

a **Real Part Key:** For storing the real number in Complex mode.

b **Imaginary Part Key:** For storing the imaginary number in Complex mode.

Example:

Value	Operation	Display
	SHIFT CPLX	(CPLX)
(12 – 3i) – (4 + 7i)	1 2 a 3 (–) b (–) 4 a 7	
= 8 – 10i	b =	8.
	b	–10.
(6 – 7i) × (–8 +9i)	6 a 7 (–) b × 8 (–) a 9	
= 15 +110i	b =	15.
	b	110.

Rectangular ⟷ Polar Conversion
See P.36 "Basic Function Calculations".

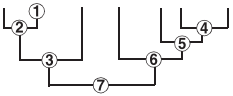
3. Order Of Operations

The calculator will automatically determine the operation priority of each individual command as follows:

HIGHEST PRIORITY

1. Calculation within parentheses **( )**.
2. Exponent (EXP):
3. Function keys:
   x^3, x^2, x^{-1}, x!, °‴, ◄°‴, %
   Angle unit conversions (DRG►, DRG)
   $\sqrt{\ }$, $\sqrt[3]{\ }$, log, ln, e^x, 10^x,
   sin, cos, tan, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, sinh, cosh, tanh, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$
4. Fractions (ab/c, d/c)
5. Negative value ((–))
6. Powers and roots: x^y, $\sqrt[x]{\ }$
7. Permutations (nPr) and combinations (nCr)
8. ×, ÷
9. +, −

Example: $5 \div 4^2 \times 7 + 3 \times 0.5^{\mathrm{COS}60^\circ} = 4.308820344$



Levels of calculations (Stack Memory)

During actual calculation, lower precedence calculations are stored in the stack memory and then processed in turn. This stack memory can store up to 5 levels of calculations.

Example: $1 + 2 \times (\sin 30^\circ + 6 \times (2 + 3 \times 2.2)) = 105.2$

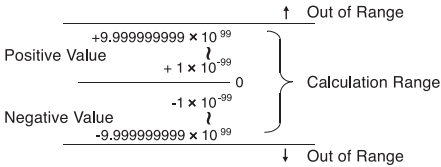
levels ..... ① ② ③ ④ ⑤

4. Calculation Range

- If the result of a calculation is out of the range indicated here, an error occurs.
- For the calculation range during function calculation, refer to P.36 "Operation Range and Accuracy".

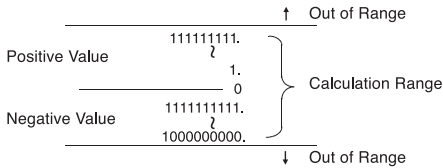
Decimal Numbers

A maximum of 10 digits in the mantissa, or 10 digits in the mantissa with 2 digits in the exponent, can be entered or displayed. A negative value is indicated by adding a minus (–) sign, the calculation range is defined as follows:



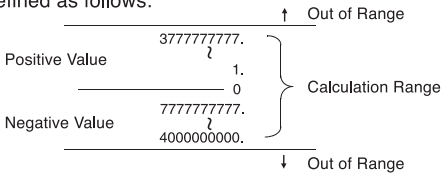
Binary Numbers

Binary integers of up to 10 digits can be entered and displayed. Negative binary values are expressed by their two's complement. The calculation range is defined as follows:



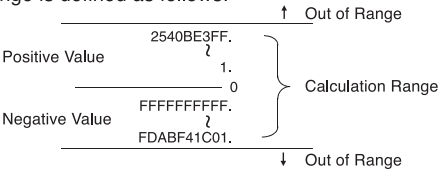
Octal Number

A maximum of 10 octal digits can be entered and displayed. Negative octal values are expressed by their two's complement. The calculation range is defined as follows:



Hexadecimal Numbers

A maximum of 10 hexadecimal digits can be entered and displayed. Negative hexadecimal values are expressed by their two's complement. The calculation range is defined as follows:



Two's Complement Calculation

In computer calculations the complement is used to express negative values without using + and – signs. Subtraction is performed by adding the complement.

Example: Enter 1 in binary and subtract 1 three times.

Operation	Display	Decimal
ON/CA SHIFT ▶BIN	(BIN) 0.	
1	1.	1
– 1 =	0.	0
=	1111111111.	–1
=	1111111110.	–2

5. Statistical Calculations

Basic procedure

- Press [SHIFT], [STAT]. The "STAT" indicator lights up.
- Enter the first data and press [Data].
- After entering the data, press the statistical calculation keys (e.g. [$], [$\bar{x}$] ...).
- Press [SHIFT], [STAT] to exit the statistical calculation mode and clear the statistical calculation memory.

Example:

Operation	Display	Explanation
[ON/CA] [SHIFT] [STAT]	(STAT) 0.	Statistic mode
[1] [0]	10.	Enter 10
[Data]	1.	Data 1 entry
[2] [0]	20.	Enter 20
[Data]	2.	Data 2 entry
[3] [0]	30.	Enter 30
[Data]	3.	Data 3 entry
[4] [0]	40.	Enter 40
[Data]	4.	Data 4 entry
[5] [0] [=]	50.	Enter 50
[Data]	5.	Data 5 entry
[$\bar{x}$]	30.	Mean of x
[n]	5.	Total number of data sample
[s]	15.8113883.	Sample Standard Deviation of x
[SHIFT] [Σx]	150.	Summation of x
[SHIFT] [Σx^2]	5500.	Sum of Square of the value
[SHIFT] [σ]	14.14213562.	Population of Standard Deviation of x
[SHIFT] [min x]	10.	The min data
[SHIFT] [max x]	50.	The max data

Add / Delete Statistical Data

• Use [Data] and [SHIFT] [CD]

Example: Add LCD current display

Operation	Display	Explanation
[SHIFT] [STAT]	(STAT)	
[1] [0]	10.	Enter 10
[Data]	1.	Data 1 entry
[2] [0]	20.	Enter 20
[Data]	2.	Data 2 entry
[Data]	3.	Data 3 entry

Example: Delete LCD display

Operation	Display	Explanation
[SHIFT] [STAT]	(STAT)	
[1] [0]	10.	Enter 10
[Data]	1.	Data 1 entry
[2] [0]	20.	Enter 20
[Data]	2.	Data 2 entry
[3] [0]	30.	Enter 30
[Data]	3.	Data 3 entry
[4] [0]	40.	Enter 40
[Data]	4.	Data 4 entry
[SHIFT] [CD]	3.	Delete data
[SHIFT] [Σx²]	96.	

Output of Statistical Calculation Results

Output	Operation	Equation
Number of data sample	n	--
Mean of x	$\bar{x}$	$\bar{x} = \sum_{i=1}^{n} x_i / n$
Sample standard deviation of x	s	$s = \sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 / (n-1)}$
Population standard deviation of x	SHIFT [σ]	$\sigma^n = \sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 / n}$
Variance of sample	s x^2	$V^{n-1} = \sum_{i=1}^{n} (x_i - \bar{x})^2 / (n-1)$
Variance of population	SHIFT x^2	$V^n = \sum_{i=1}^{n} (x_i - \bar{x})^2 / n$
Summation of x	SHIFT [Σx]	Σx
Sum of Square	SHIFT [Σx²]	Σx^2

Statistical Calculation Examples

You bought 20 pieces of pizza. However, the diameter of each pizza is varied as shown in the following table. Please calculate the statistic based on this information.

Diameter	Midpoint	Frequency
27.6 ~ 28.5	28	2
28.6 ~ 29.5	29	4
29.6 ~ 30.5	30	5
30.6 ~ 31.5	31	6
31.6 ~ 32.5	32	3
		(20 in total)

Operation	Display	Explanation
ON/CA SHIFT STAT	(STAT) 0.	Statistic mode
SHIFT FIX 4	0.0000	Decimal digit specification
2 8 × 2 Data	2.0000	Give the sum of frequency
2 9 × 4 Data	6.0000	
3 0 × 5 Data	11.0000	
3 1 × 6 Data	17.0000	
3 2 × 3 Data	20.0000	
n	20.0000	Total number of data sample
$\bar{x}$	30.2000	Mean of x
SHIFT [Σx]	604.0000	Summation of x
SHIFT [Σx^2]	18270.0000	Sum of Square of the value
s	1.2397	Sample standard deviation of x
SHIFT [σ]	1.2083	Population of standard deviation of x

6. Errors

The calculator will overflow in the following instances. Further calculations will not be possible as the calculator will be electronically locked.

- When the calculation result is outside the following range:
  $x = 0, 1 \times 10^{-99} \leqq |x| < 1 \times 10^{100}$
  x: Calculation result
- When the contents of the memory are outside the following range:
  $x = 0, 1 \times 10^{-99} \leqq |x| < 1 \times 10^{100}$
  x: Memory contents
  (The data stored before the overflow error are retained.)
- When numbers are entered outside the following range and a basic function key (+, –, ×, ÷) is pressed.
  $x = 0, 1 \times 10^{-99} \leqq |x| < 1 \times 10^{100}$
- When a ÷ 0 (division by 0) is performed.
- When data exceeds the range of any function or statistical calculation.
- During statistical calculation;
  (1) If **S** is calculated with only one data input
  (2) To find $\bar{x}$, σ and **S** when n = 0
  (3) When any input is outside the allowable calculation range:
  $x = 0, 1 \times 10^{-99} \leqq |x| < 1 \times 10^{100}$
  x: calculation result
  (4) When any input is outside the allowable calculation range:
  $x = 0, 1 \times 10^{-99} \leqq |x| < 1 \times 10^{100}$
- When the number of operators stored in the calculator during parentheses and arithmetic calculation exceeds 5 levels.
- When more than 15 open paretheses are used at one time.

The overflow display is: (E 0.)
Press [ON CA], to clear the error.

CALCULATION EXAMPLES

1. Decimal Calculations (Degree Mode)

Initial mode setting:

Calculation Mode:	Decimal Degree Mode [SHIFT] [DRG▶]	(DEG)
Display Mode:	Floating Mode	
Decimal Point:	Resetting [SHIFT] [FIX] [▪]	(0.)

Addition and Subtraction

Example	Operation	Display
8 + 3 + 5.5 = 16.5	[8] [+] [3] [+] [5] [▪] [5] [=]	16.5
4 – 7 – 3 = –6	[4] [–] [7] [–] [3] [=]	–6.

Multiplication and Division

Example	Operation	Display
3.6 x 1.7 = 6.12	[3] [▪] [6] [×] [1] [▪] [7] [=]	6.12
592 ÷ 4.8 = 123.3333333	[5] [9] [2] [÷] [4] [▪] [8] [=]	123.3333333

Mixed Calculations

Example	Operation	Display
3 + 5 x 7 = 38	[3] [+] [5] [×] [7] [=]	38.
6 x 9 + 3 ÷ 2 = 55.5	[6] [×] [9] [+] [3] [÷] [2] [=]	55.5

Exponential Calculations

Example	Operation	Display
$(321 \times 10^{-14}) \times$ $(65 \times 10^{28}) =$ 2.0865×10^{18}	3 2 1 EXP 1 4 (−) × 6 5 EXP 2 8 =	2.0865^{18}

Fractional Calculations

Example	Operation	Display
$\frac{2}{3} + 3\frac{4}{7} - \frac{5}{4} = 2\frac{83}{84}$	2 a b/c 3 + 3 a b/c 4 a b/c 7 − 5 a b/c 4 =	2␣83␣84.
$(\frac{3}{5} + 2\frac{3}{8}) \times \frac{2}{5} \div 2 - 1$ $= -\frac{81}{200}$	(3 a b/c 5 + 2 a b/c 3 a b/c 8) × 2 a b/c 5 ÷ 2 − 1 =	–81␣200.

Constant Calculations

Example	Operation	Display
$2 + \underline{3} = 5$	2 + 3 =	5.
$4 + \underline{3} = 7$	4 =	7.
$1 - \underline{2} = -1$	1 − 2 =	–1.
$2 - \underline{2} = 0$	2 =	0.
$\underline{3} \times 2 = 6$	3 × 2 =	6.
$\underline{3} \times 4 = 12$	4 =	12.
$6 \div \underline{3} = 2$	6 ÷ 3 =	2.
$9 \div \underline{3} = 3$	9 =	3.

Parentheses Calculations

Example	Operation	Display
$3 + [(4 - 3.6 + 5) \times$ $0.8 - 6] \times 4.2 =$ -4.056	3 + ((4 − 3 . 6 + 5) × (0 . 8 − 6) × 4 . 2 =	–4.056

Percentage Calculations

Example	Operation	Display
200 x 17% = 34	2 0 0 × 1 7 SHIFT % =	34.
$\frac{456}{789}$ × 100 = 57.79467681%	4 5 6 ÷ 7 8 9 SHIFT % =	57.79467681

Constant Percentage Calculations

Example	Operation	Display
12% x 1200 = 144	1 2 SHIFT % × 1 2 0 0 =	144.
12% x 1500 = 180	1 5 0 0 =	180.
$\frac{765}{987}$ x 100% = 77.50759878%	7 6 5 ÷ 9 8 7 SHIFT % =	77.50759878
$\frac{654}{987}$ x 100% = 66.26139818%	6 5 4 =	66.26139818

Add-On (Mark Up) Calculation

Example	Operation	Display
200 + (200 x 20%) = 240	2 0 0 + 2 0 SHIFT % =	240.

Discount Calculation

Example	Operation	Display
200 – (200 x 20%) = 160	2 0 0 – 2 0 SHIFT % =	160.

Independent Memory Calculation

Example	Operation	Display
	ON/CA X→M	0.
20 x 30 = 600	2 0 × 3 0 =	
	M+	M 600.
40 x 50 = 2000	4 0 × 5 0 =	
	M+	M 2000.
+) 15 x 20 = 300	1 5 × 2 0 =	
	M+	M 300.
2900	MR	M 2900.
−) 125 x 40 = −5000	1 2 5 × 4 0	
	= SHIFT M-	M 5000.
−2100	MR	M −2100.
	ON/CA X→M	0.

Memory Variable Calculation

Example	Operation	Display
9 x 6 + 3 = 57	9 × 6 + 3 =	
	SHIFT STO A	57.
x) 5 x 8 = 40	5 × 8 = SHIFT	
	STO B	40.
	RCL A	57.
	× RCL B	40.
2,280	=	2280.

2. Binary / Octal / Hexadecimal Calculations

Binary Calculations

• Addition and Subtraction (BIN): [ON CA] [SHIFT] [▶BIN]

Example	Operation	Display
10101011 + 1100 + 1110 = 11000101	[1] [0] [1] [0] [1] [0] [1] [1] [+] [1] [1] [0] [0] [+] [1] [1] [1] [0] [=]	11000101.
11100011 – 10101100 = 110111	[1] [1] [1] [0] [0] [0] [1] [1] [–] [1] [0] [1] [0] [1] [1] [0] [0] [=]	110111.

• Multiplication and Division (BIN)

Example	Operation	Display
11 x 1001 = 11011	[1] [1] [×] [1] [0] [0] [1] [=]	11011.
1101110 ÷ 1010 = 1011	[1] [1] [0] [1] [1] [1] [0] [÷] [1] [0] [1] [0] [=]	1011.

Octal Calculations

• Addition and Subtraction (OCT): [ON CA] [SHIFT] [▶OCT]

Example	Operation	Display
654 + 321 = 1175	[6] [5] [4] [+] [3] [2] [1] [=]	1175.
741 – 357 = 362	[7] [4] [1] [–] [3] [5] [7] [=]	362.

• Multiplication and Division (OCT)

Example	Operation	Display
56 x 23 = 1552 621 ÷ 12 = 50	5 6 × 2 3 = 6 2 1 ÷ 1 2 =	1552. 50.

• Mixed Calculations (OCT)

Example	Operation	Display
52 + 63 x 14 = 1216	5 2 + 6 3 × 1 4 =	 1216.

Hexadecimal Calculations

• Addition and Subtraction (HEX): ON/CA SHIFT ▶HEX

Example	Operation	Display
AAA + BB + C = B71 DEF – EFE = FFFFFFFEF1	A A A + B B + C = D E F − E F E =	 b71. FFFFFFFEF1.

• Multiplication and Division (HEX)

Example	Operation	Display
FEDC x A9 = A83F3C CA11 ÷ DF = E7	F E D C × A 9 = C A 1 1 ÷ D F =	 A83F3C. E7.

• Mixed Calculations (HEX)

Example	Operation	Display
(AB + 9) x D ÷ F = 9C	(A B + 9) × D ÷ F =	 9C.

3. Basic Function Calculations

Pi Function: [π]

Example	Operation	Display
π x 10	[SHIFT] [π] [×] [1] [0] [=]	31.41592654

Trigonometric Functions: [sin] [cos] [tan]

Example	Operation	Display
sin53 = 0.79863551	[DEG mode] [5] [3] [sin]	0.79863551
cos $\frac{\pi}{6}^{RAD}$ =	[RAD mode] [SHIFT] [π] [÷]	
0.866025403	[6] [=] [cos]	0.866025403
tan65^{GRAD} =	[GRAD mode] [6] [5] [tan]	
1.631851687		1.631851687

Inverse Trigonometric Functions: [$\sin^{-1}$] [$\cos^{-1}$] [$\tan^{-1}$]

Example	Operation	Display
$\sin^{-1}$ 0.3 =	[DEG mode] [.] [3] [SHIFT]	
17.45760312°	[$\sin^{-1}$]	17.45760312
$\cos^{-1}$ 0.8 =	[DEG mode] [.] [8] [SHIFT]	
36.86989765°	[$\cos^{-1}$]	36.86989765
$\tan^{-1}$ 1.5 =	[DEG mode] [1] [.] [5]	
56.30993247°	[SHIFT] [$\tan^{-1}$]	56.30993247

Logarithmic Functions: [log] [ln]

Example	Operation	Display
log123 =	[1] [2] [3] [log]	
2.089905111		2.089905111
ln123 =	[1] [2] [3] [ln]	
4.812184355		4.812184355

Logarithmic Mean: [ln]

Example	Operation	Display
$L = \frac{4-8}{\ln 4 - \ln 8} =$ 5.770780164	[(] [4] [−] [8] [)] [÷] [(] [4] [ln] [−] [8] [ln] [)] [=]	5.770780164

Exponential Functions: [10^x] / [e^x]

Example	Operation	Display
e^{22} = 3584912846	[2] [2] [SHIFT] [e^x]	3584912846
$10^{2.3}$ = 199.5262315	[2] [.] [3] [SHIFT] [10^x]	199.5262315

Square Calculations: [x^2]

Example	Operation	Display
1.25^2 = 1.5625	[1] [.] [2] [5] [x^2]	1.5625

Cubic Calculations: [x^3]

Example	Operation	Display
5.43^3 = 160.103007	[5] [.] [4] [3] [SHIFT] [x^3] [=]	160.103007

Power Calculations: [x^y]

Example	Operation	Display
2.11^5 = 41.82272021	[2] [.] [1] [1] [x^y] [5] [=]	41.82272021

Constant Power Calculations: [x^y]

Example	Operation	Display
$2^{2.34}$ = 5.063026376	[2] [x^y] [2] [.] [3] [4] [=]	5.063026376
$3^{2.34}$ = 13.07566351	[3] [=]	13.07566351
$4^{2.34}$ = 25.63423608	[4] [=]	25.63423608

Extraction of Square Root: [√]

Example	Operation	Display
$\sqrt{(5+6) \times 7}$ =	[(] [5] [+] [6] [)]	
8.774964387	[7] [=] [√]	8.774964387

Multiple Root: [$x^{1/y}$]

Example	Operation	Display
$\sqrt[5.3]{100}$ =	[1] [0] [0] [SHIFT] [$x^{1/y}$] [5]	
2.384286779	[.] [3] [=]	2.384286779

Constant Multiple Root Calculations: [$x^{1/y}$]

Example	Operation	Display
$\sqrt[5]{1024} = 4$	[1] [0] [2] [4] [SHIFT] [$x^{1/y}$]	
	[5] [=]	4.
$\sqrt[5]{3125} = 5$	[3] [1] [2] [5] [=]	5.
$\sqrt[5]{7776} = 6$	[7] [7] [7] [6] [=]	6.

Geometric Mean: [$x^{1/y}$]

Example	Operation	Display
$\overline{G} = \sqrt[4]{1.23 \times 1.48 \times 1.96 \times 2.2}$	[1] [.] [2] [3]	
	[×] [1] [.] [4]	
	[8] [×] [1] [.]	
	[9] [6] [×] [2]	
	[.] [2] [=] [SHIFT]	
= 1.673830182	[$x^{1/y}$] [4] [=]	1.673830182

Extraction of Cubic Root: [$\sqrt[3]{}$]

Example	Operation	Display
$\sqrt[3]{123}$ =	[1] [2] [3] [SHIFT] [$\sqrt[3]{}$]	
4.973189833		4.973189833

Reciprocal Calculations: x^{-1}

Example	Operation	Display
$\frac{1}{2\times3+4} = 0.1$	2 × 3 + 4 = SHIFT x^{-1}	0.1

Trigonometric Calculations: x^{-1}

Example	Operation	Display
cosec x = 1/sin x cosec 45° = 1.414213562	[DEG mode] 4 5 sin SHIFT x^{-1}	1.414213562

Factorial Calculations: $x!$

Example	Operation	Display
(4 x 2 – 3) ! = 120	4 × 2 − 3 = SHIFT $x!$	120.

Hyperbolic Functions: hyp

Example	Operation	Display
cosh34 = 2.917308713 x 10^{14}	3 4 hyp cos	2.917308713^{14}
tanh1.23 = 0.842579325	1 ▪ 2 3 hyp tan	0.842579325

Degree → Radian Conversion: DRG

Example	Operation	Display
60° = 1.047197551^{RAD}	[DEG mode] 6 0 SHIFT DRG▶	1.047197551

Radian → Gradient Conversion: DRG▶

Example	Operation	Display
2^{RAD} = 127.3239545^{GRAD}	[RAD mode] 2 SHIFT DRG▶	127.3239545

Gradient → Degree Conversion: DRG▶

Example	Operation	Display
$120^{GRAD} = 108$	[GRAD mode] 1 2 0 SHIFT DRG▶	108.

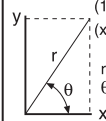
Permutations (of n things taken r at a time): nPr

Example	Operation	Display
${}_nP_r = \frac{n!}{(n-r)!}$ ${}_5P_3 = \frac{5!}{(5-3)!} = 60$	5 SHIFT nPr 3 =	60.

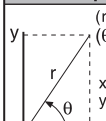
Combinations (of n things taken r at a time): nCr

Example	Operation	Display
${}_nC_r = \frac{n!}{r!(n-r)!}$ ${}_5C_3 = \frac{5!}{3!(5-3)!} = 10$	5 SHIFT nCr 3 =	10.

Rectangular → Polar Conversion: R↔P

Example	Operation	Display
	[DEG mode] 1 a 3 √ b SHIFT R↔P b	2. 60.

Polar → Rectangular: R↔P

Example	Operation	Display
	[DEG mode] 2 a 6 0 b SHIFT R↔P b	1. 1.732050808

Degrees-Minutes-Seconds (DMS) → Decimal Degrees: [o ′ ″]

Example	Operation	Display
123°45'06" →	1 2 3 [o ′ ″] 4 5 [o ′ ″]	
123.7516667°	0 6 [o ′ ″] = [SHIFT] [4 o ′ ″]	123.7516667

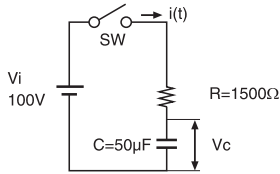
Decimal Degrees → Degrees-Minutes-Seconds: [4 o ′ ″]

Example	Operation	Display
2.3456 →	2 . 3 4 5 6	
2°20'44.16"	= [SHIFT] [4 o ′ ″]	2°20'44"16

4. Applied Calculations

Electricity - Integrating Circuit Problem

Obtain the voltage Vc across the capacitor at t=56ms after the switch is turned on.



Example	Operation	Display
$Vc = Vi\,(1 - e^{-\frac{1}{RC}})$	1 0 0 ×	
$= 100 \times \left(1 - e^{-\frac{56 \times 10^{-3}}{1500 \times 50 \times 10^{-6}}}\right)$	(1 − (	
	1 5 0 0	
= 52.60562649	× 5 0 EXP	
	6 (−) ÷ 5	
	6 EXP 3 (−)	
	) [SHIFT] x^{-1} (−)	
	[SHIFT] e^{x}) =	52.60562649

Algebra

The Root of a Quadratic Equation (only for problems having a real root)

Example	Operation	Display
$4x^2 + 9x + 2 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} =$ $\frac{-9 \pm \sqrt{9^2 - 4 \times 4 \times 2}}{2 \times 4}$ $x = \begin{cases} -0.25 \\ -2 \end{cases}$	9 x^2 − 4 × 4 × 2 = X→M (9 (−) + MR √) ÷ 2 ÷ 4 = (9 (−) − MR √) ÷ 2 ÷ 4 =	M 49. M −0.25 M −2.

Calculation of time

Example 1: The air flight departs at 2 o'clock 9 minutes and 56 seconds (2°09'56"), and arrives at 4 o'clock 18 minutes and 23 seconds (4°18'23").
What is the travel time

Example	Operation	Display
4°18'23" −	4 °′″ 1 8 °′″ 2	
2°09'56" =	3 °′″ − 2 °′″ 0	
2°08'27"	9 °′″ 5 6 °′″ =	2°8'27"

Example 2:

The following shows the amount of time worked in three days. What was the total time?
1st day : 5 hours 46 minutes (5°46')
2nd day : 4 hours 39 minutes (4°39')
3rd day : 3 hours 55 minutes (3°55')

Example	Operation	Display
5°46' + 4°39' +	5 °′″ 4 6 °′″ +	
3°55' = 14°20'	4 °′″ 3 9 °′″ +	
	3 °′″ 5 5 °′″ =	14°20'0"

5. Operation Range and Accuracy

Internal digits: 14

Accuracy*: ±1 at the 10^{th} digits

Output Ranges : 1×10^{-99} to $\pm 9.999999999 \times 10^{99}$

Function		Input	
sin x	DEG	$0 \leqq \|x\| < 4.5 \times 10^{10}$	
	RAD	$0 \leqq \|x\| \leqq 785398163.3$	
	GRAD	$0 \leqq \|x\| < 5 \times 10^{10}$	
cos x	DEG	$0 \leqq \|x\| < 4.5 \times 10^{10}$	
	RAD	$0 \leqq \|x\| \leqq 785398163.3$	
	GRAD	$0 \leqq \|x\| < 5 \times 10^{10}$	
tan x	DEG	Same as sinx except $\|x\| = 90\,(2n-1)$	
	RAD	Same as sinx except $\|x\| = \pi/2\,(2n-1)$	
	GRAD	Same as sinx except $\|x\| = 100\,(2n-1)$	
$\sin^{-1}x$ $\cos^{-1}x$		$0 \leqq \|x\| \leqq 1$	
$\tan^{-1}x$ tanh x		$0 \leqq \|x\| < 1 \times 10^{100}$	
sinh x cosh x		$0 \leqq \|x\| \leqq 230.2585092$	When x=0, sinh and tanh, being in some condition, will have more possibility of error, and influence accurancy.
$\sinh^{-1}x$		$0 \leqq \|x\| < 5 \times 10^{99}$	
$\cosh^{-1}x$		$1 \leqq x < 5 \times 10^{99}$	
$\tanh^{-1}x$		$0 \leqq \|x\| \leqq 9.999999999 \times 10^{-1}$	
ln x		$0 < x < 1 \times 10^{100}$	
log x		$0 < x < 1 \times 10^{100}$	
10^x		$-1 \times 10^{100} < x \leqq 99.99999999$	
e^x		$-1 \times 10^{100} < x \leqq 230.2585092$	
$\sqrt{x}$		$0 \leqq x < 1 \times 10^{100}$	
x^2		$0 \leqq \|x\| < 1 \times 10^{100}$	
x^{-1}		$1 \times 10^{-99} < \|x\| < 1 \times 10^{100}$, $x \neq 0$	
$\sqrt[3]{x}$		$0 \leqq \|x\| < 1 \times 10^{100}$	
x!		$0 \leqq x \leqq 69$ (Integer)	
x^3		$0 \leqq \|x\| \leqq 2.154434689 \times 10^{33}$	

Function	Input
nPr	$0 \leqq r \leqq n \leqq 9999999999$ (r and n are integer) result $< 1 \times 10^{100}$
nCr	$0 \leqq r \leqq n \leqq 9999999999$ (r and n are integer) result $< 1 \times 10^{100}$
x^y	$-1 \times 10^{100} < y \cdot \ln\lvert x\rvert \leqq 230.2585092$ x>0…The above range x<0…y (integer) or, 1/y (odd, y≠0) … The above range x=0…0<y
$x^{1/y}$	$-1 \times 10^{100} < 1/y \cdot \ln\lvert x\rvert \leqq 230.2585092$ x>0…The above range x<0…y (odd) or, 1/y (integer, y≠0) … The above range x=0…0<y
R→P	$\lvert x\rvert$,$\lvert y\rvert < 1 \times 10^{100}$ $(x^2+y^2)^{1/2} < 1 \times 10^{100}$ y/x same as $\tan^{-1} x$
P→R	$0 \leqq r < 1 \times 10^{100}$ θ : same as sinx, cosx
° ′ ″	$0 \leqq \lvert x\rvert \leqq 999999.9999$ When input > 999999.9999 the result can not converted to DMS by SHIFT ° ′ ″
° ′ ″	$0 \leqq \lvert x\rvert \leqq 999999''59'$
DEG→RAD	$0 \leqq \lvert x\rvert < 1 \times 10^{100}$
RAD→GRAD	$0 \leqq \lvert x\rvert \leqq 1.570796326 \times 10^{98}$
GRAD→DEG	$0 \leqq \lvert x\rvert < 1 \times 10^{100}$

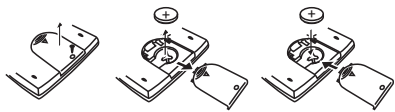
Function		Input
Complex number calculation	(x1+y1 i) $\begin{matrix}+\\ \times\\ \div\end{matrix}$ (x2+y2 i)	
	Addition Subtraction	$\lvert x1+x2\rvert < 1\times10^{100}$ $\lvert y1+y2\rvert < 1\times10^{100}$
	Multiplication	$(x1\times2-y1\times2) < 1\times10^{100}$ $(x1\times2+y1\times2) < 1\times10^{100}$ (x1x2), (y1y2), (x1y2), (y1x2) $< 1\times10^{100}$
	Division	$\frac{x1\times2+y1\times2}{x2^2+y2^2}, \frac{y1\times2-x1\times2}{x2^2+y2^2} < 1\times10^{100}$ $x2^2 + y2^2$, $x2^2, y2^2$, x1x2+ y1y2, y1x2 – x1y2, x1x2, y1y2, y1x2, x1y2 $< 1\times10^{100}$
→ DEC		The following operation range after the conversion. $0 \leqq \lvert x \rvert \leqq 9999999999$
→ BIN		The following operation range after the conversion. $1000000000 \leqq x \leqq 1111111111$ $0 \leqq x \leqq 1111111111$
→ OCT		The following operation range after the conversion. $4000000000 \leqq x \leqq 7777777777$ $0 \leqq x \leqq 3777777777$
→ HEX		The following operation range after the conversion. $FDABF41C01 \leqq x \leqq FFFFFFFFFF$ $0 \leqq x \leqq 2540BE3FF$
Normal Distributions-statistic Calculation	DATA INPUT	$\lvert x \rvert < 1\times10^{100}$ $\lvert \Sigma x \rvert < 1\times10^{100}$ $\Sigma x^2 < 1\times10^{100}$ n = Integer $\lvert n \rvert < 1\times10^{100}$
	$\bar{x}$	$n \neq 0$
	s	$n \neq 1, n \neq 0$ $0 \leqq \frac{\Sigma x^2 - \{(\Sigma x)^2/n\}}{n-1} < 1\times10^{100}$
	$x\sigma^n$	$n \neq 0$ $0 \leqq \frac{\Sigma x^2 - \{(\Sigma x)^2/n\}}{n} < 1\times10^{100}$

* In the case of consecutive calculations, errors are cumulative. This is also true when internal consecutive calculations are performed; for example, (x^y) , $x^{1/y}$, x!, nPr, nCr, etc. In this case, the cumulative data may become large.

BATTERY REPLACEMENT

When the display characters are dim, turn it off, and replace the alkaline battery immediately.
Please replace the alkaline battery using the following procedure:

1. Press OFF to power off the calculator.
2. Remove the screw that secrues the battery cover in place.
3. Slide the battery cover slightly and lift it.
4. Remove the old battery with a ball point pen or similar sharp object.
5. Load the new battery with positive "+" side facing up.
6. Replace the battery cover, tighten the screw, and press ON CA, SHIFT + • RESET to initialize the calculator.



Battery Replacement

CAUTION: There is risk of explosion if the battery is replaced by an incorrect type. Dispose of used battery according to the below instructions.

Electromagnetic interference or electrostatic discharge may cause the display to malfunction or the contents of the memory to be lost or altered. Should this occur, press ON CA to restart the calculator.

ADVICE AND PRECAUTIONS

- This calculator contains precision components such as LSI chips and should not be used in a place subject to rapid variations in temperature, excessive humidity dirt or dust, or exposed to direct sunlight.
- The liquid crystal display panel is made of glass and should not be subjected to excessive pressure.
- When cleaning the device do not use a damp cloth or volatile liquid such as paint thinner. Instead, use only a soft, dry cloth.
- Do not under any circumstances, disassemble this device. If you believe that the calculator is not functioning properly, either bring or mail the device together with proof of purchase to a Canon Business office service representative.
- Never dispose the calculator improperly such as burning; it can create risks of personal injury or harm. You are suggested to dispose this product according to your national law.
- Replace the battery once every two years even it is not used frequently.

Battery Caution!

- Keep the Battery out of reach of children. If the battery is swallowed, contact a doctor immediately.
- Misuse of battery may cause leakage, explosion, damages or personal injury.
- Don't recharge or disassemble the battery, it could cause a short circuit.
- Never expose the battery to high temperatures, direct heat, or dispose by incineration.
- Never leave a dead battery in the calculator as the dead battery may leak and cause damage to the calculator.
- Continue using the calculator in the low battery condition may cause improper calculations or the stored memory may get corrupted or lost completely. Keep written records of important data all the time; and replace the battery as soon as possible.

■ When you are not sure of the current calculations and setting mode, you are recommended to initialize the calculator to default value by pressing SHIFT + • RESET .

SPECIFICATIONS

Power Supply : Alkaline battery (LR54 x 1)
Power Consumption : DC1.5V / 0.038mW
Battery Life : Approximately 2.5 years
(Based on 1 hour operation per day)
Auto power off : Approx. 7 minutes
Usable Temperature : 0^{o} ~ 40^{o} C
Dimension: 122 (L) x 73 (W) x 12 (H)mm with cover
Weight : 70 g with cover
* Specifications are subject to change without notice