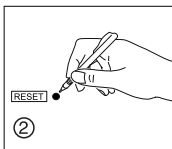
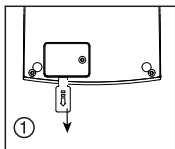




## F-730SX SCIENTIFIC CALCULATOR User Guide

### First Time Operation

1. Remove the battery insulation tab to load the battery. (Figure ①)
2. To initialize the calculator, use the tip of a ballpoint pen (or similar sharp object) to press the [RESET] button on the back of the calculator. (Figure ②)



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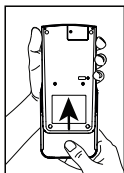
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## SAFETY PRECAUTIONS

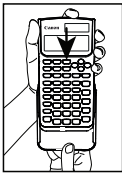
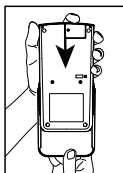
- This calculator contains precision components such as LSI chips and should not be used in places subject to rapid variations in temperature, excessive humidity, dirt or dust, or exposure to direct sunlight.
- Do not apply excessive pressure on the liquid crystal display panel as it is made of glass.
- Use a soft, dry cloth to clean the calculator. Do not clean with a damp cloth or volatile liquid such as paint thinner.
- Do not under any circumstances dismantle the device. If the calculator is not functioning properly, please contact Canon Service & Support or mail the device with the Warranty to a Canon service location.
- Do not improperly dispose of the calculator such as in an incinerator as it may cause personal injury or harm. Please dispose of the product in accordance with National regulations
- It is recommended to replace the battery once every two years.

## USING THE PROTECTIVE SLIDE CASE

Slide the unit out of the protective case to open or close the cover as shown in the figure.

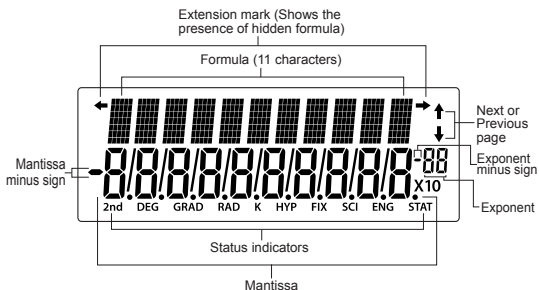


OPEN



CLOSE

## DISPLAY (2-LINE DISPLAY)



### <Status Indicators>

2nd : 2nd Function

DEG : Degree Mode

GRAD : Gradient Mode

RAD : Radian Mode

K : Constant

HYP : Hyperbolic

FIX : Fixed Mode

SCI : Scientific Exponential Mode


ENG : Engineering Exponential Mode

STAT : Statistic Mode


## TO GET STARTED

### Power ON and OFF





 **(Power ON):** Turns on the calculator.



 **(Power OFF):** Turns off the calculator.

#### ■ Auto Power Off Function:

If the calculator is not used for about 7 minutes, it will automatically power off. Press  key to turn the calculator on again.

### Input Capacity







F-730SX can accommodate up to 87 steps in Normal mode and 47 steps in STAT mode in a single calculation. One step is used when you press one of the numeric keys, arithmetic keys, scientific calculation keys or  key. Pressing ,   and the direction keys will not take up any steps.

When you reach 79 steps in Normal mode or 39 steps in STAT mode of any calculation, the cursor changes from  to  notifying you that the memory is running low. In case you need to input a single calculation with more than 87 steps in Normal mode and 47 steps in STAT mode, you can separate the calculation into two or more segments.

### Display Format Setting (Notation – Fix, Sci, Eng)

F-730SX can display up to 10 digits. Values exceeding the 10-digit limit will automatically be displayed in exponent notation format.

**Example :** Changing the display format of 0.12345

Display Setting	Operation	Display (Lower)
Default Setting : Floating-Decimal		0.12345
Scientific Notation (SCI)		1.2345 <sup>-01</sup> <sub>x10</sub>
Engineering Notation (ENG) (Exponent is a multiple of 3)		123.45 <sup>-03</sup> <sub>x10</sub>
Fixed Decimal places: 1		123.5 <sup>-03</sup> <sub>x10</sub>
Restore to Standard Notation (Floating-decimal)	 	0.1 0.12345

## Inputting and Editing Calculations



New input begins on the left of the upper (entry) line. When the entries are over 11 digits, the line will move to the right consecutively. Press  $\leftarrow$   $\rightarrow$  to scroll the cursor within the upper (entry) line and edit your calculation as needed.

### Example (Editing an Entry):

234567  $+$  889900

$\leftarrow$ 567+889900

### Replacing an Entry (1234567 $\rightarrow$ 1234560)

Display Setting	Operation	Display (Upper)
Press or press continuously for "7" blinks	$\leftarrow$	123456 $+$ 889 $\rightarrow$
Replace with "0"	0	1234560 $+$ 889 $\rightarrow$

### Deletion (1234560 $\rightarrow$ 134560)

Display Setting	Operation	Display (Upper)
Press or press continuously for "2" blinks	$\leftarrow$	1 $+$ 34560 + 889 $\rightarrow$
"2" is deleted	DEL	1 $+$ 4560 + 8899 $\rightarrow$

### Insertion (889900 $\rightarrow$ 2889900)

Display Setting	Operation	Display (Upper)
Press or press continuously for "8" blinks	$\rightarrow$	134560 $+$ 8899 $\rightarrow$
"8" and "_" blinks alternately	2nd INS	134560 $+$ 8899 $\rightarrow$
Insert "2", "8" continues to blink	2	134560 $+$ 28899 $\rightarrow$

### Replay

- After the calculation is executed, the calculation expression and its result is automatically stored in memory.
- Press  $\uparrow$  (or  $\downarrow$ ) to replay the performed calculation expressions and results.
- The calculation memory is cleared when:
  - i) 2nd RESET  $\rightarrow$   $\equiv$  (RESET: Y) keys are pressed (which initializes the calculator).
  - ii) Calculation mode is changed.

## Order of Operations

The calculator will automatically determine the operation priority. This means that algebraic expressions can be entered just as they are written and the calculation priority is as follows:

1st Priority	Recall memory (A-E), RAND
2nd	Calculation with parentheses ( ).
3rd	Function with parentheses that requests the input argument to the right. log(, ln(, 10^(, e^(, $\sqrt{\quad}$ ), sin(, cos(, tan(, $\sin^{-1}$ (, $\cos^{-1}$ (, $\tan^{-1}$ (, sinh(, cosh(, tanh(, $\sinh^{-1}$ (, $\cosh^{-1}$ (, $\tanh^{-1}$ (, R>Pr(, R>Pθ(, P>Rx(, P>Ry( and RANDI(
4th	Fractions
5th	Functions that come after the input value preceded by values. $x^2$ , $x^{-1}$ , $x!$ and angle units ( ° ■ ■ r g )
6th	Power (^) and Power root ( $x\sqrt{\quad}$ )
7th	Negation (+/-) Logical NEG, NOT
8th	Permutations (nPr) and Combinations (nCr)
9th	Multiplication, implied multiplication and division
10th	Addition and subtraction
11th	Logical AND
12th	Logical OR, XOR, XNOR
13th	Conversions ( A b/c↔d/e , F↔D, ► DMS)
14th	Calculation ending instruction [=], Base-n transformation, Storage

## Input Ranges

Functions	Input Range	
$\sin x$	DEC $0 \leq  x  \leq 4.499999999 \text{ E } 10$ RAD $0 \leq  x  \leq 785398163.3$ GRA $0 \leq  x  \leq 4.999999999 \text{ E } 10$	
$\cos x$	DEC $0 \leq  x  \leq 4.500000008 \text{ E } 10$ RAD $0 \leq  x  \leq 785398165$ GRA $0 \leq  x  \leq 5.000000009 \text{ E } 10$	
$\tan x$	DEG same as $\sin x$ , except when $x = (2n-1) \times 90$ RAD same as $\sin x$ , except when $x = (2n-1) \times \pi/2$ DEG same as $\sin x$ , except when $x = (2n-1) \times 100$	
$\sin^{-1}x$ $\cos^{-1}x$	$ x  \leq 1$	
$\tan^{-1}x$	$ x  < 1 \times 10^{100}$	
$\sinh x$ $\cosh x$	$ x  \leq 230.2585092$	For $\sinh$ and $\tanh$ , errors are cumulative and accuracy is affected at a certain point when $x = 0$
$\tanh x$	$ x  < 1 \times 10^{100}$	
$\sinh^{-1}x$	$ x  < 5 \times 10^{99}$	
$\cosh^{-1}x$	$1 \leq x < 5 \times 10^{99}$	
$\tanh^{-1}x$	$ x  < 1$	
$\log x / \ln x$	$1 \times 10^{-99} \leq x < 1 \times 10^{100}$	
$10^x$	$-1 \times 10^{100} < x < 100$	
$e^x$	$-1 \times 10^{100} < x \leq 230.2585092$	
$\sqrt{x}$	$0 \leq x < 1 \times 10^{100}$	
$x^2$	$ x  < 1 \times 10^{50}$	
$1/x$	$ x  < 1 \times 10^{100}; x \neq 0$	
$x!$	$0 \leq x \leq 69$ ( $x$ is an integer)	



Functions	Input Range
$nPr/nCr$	$0 \leq r \leq n$ $n < 1 \times 10^{10}$ ( $n$ and $r$ are integers)
$R \rightarrow P$	$\sqrt{x^2 + y^2} < 1 \times 10^{100}$
$P \rightarrow R$	$0 \leq r < 1 \times 10^{100}$
	(DEG) $ \theta  < 9 \times 10^9$
	(RAD) $ \theta  < 5 \times 10^7 \pi$ rad
	(GRA) $ \theta  < 1 \times 10^{10}$ grad
o ///	o : $ x  < 1 \times 10^{100}$
	' : $x \geq 0$
	" : $x \geq 0$
$x^y$	$x > 0 : -1 \times 10^{100} < y \log x < 100$
	$x = 0 : y > 0$
	$x < 0 : y = n; \frac{1}{2n+1}$ ( $n$ is an integer)
	However : $-1 \times 10^{100} < y \log  x  < 100$
$x^{1/y}$	$x > 0 ; y \neq 0$
	$-1 \times 10^{100} < 1/y \log x < 100$
	$x = 0 : y > 0$
	$x < 0 : y = 2n + 1; 1/n$ ( $n \neq 0; n$ is an integer)
	However: $-1 \times 10^{100} < 1/y \log  x  < 100$
$a^{b/c}$	Total of integer, numerator, and denominator must be 10 digits or less (including division marks)
STAT	1-VAR : $ x  < 1 \times 10^{50}$ $0 \leq \text{FRQ} < 100$
	2-VAR : $ x  < 1 \times 10^{50}$ $ y  < 1 \times 10^{50}$
EEx	$-99 \leq x \leq 99$ ( $x$ is an integer)

- In Base-n mode, valid values in each number system:

Number system	Valid values
Binary	0, 1
Octal	0, 1, 2, 3, 4, 5, 6, 7
Decimal	0, 1, 2, 3, 4, 5, 6, 7, 8, 9
Hexadecimal	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F

- Calculation range:

Number system	Calculation range
Binary	Positive $0111111111 \geq x \geq 0$
	Negative $1111111111 \geq x \geq 1000000000$
Octal	Positive $3777777777 \geq x \geq 0$
	Negative $7777777777 \geq x \geq 4000000000$
Decimal	Positive $9999999999 \geq x \geq 0$
	Negative $-1 \geq x \geq -9999999999$
Hexadecimal	Positive $2540BE3FF \geq x \geq 0$
	Negative $FFFFFFFF \geq x \geq FDABF41C01$

## Error Messages and Error Locator

The calculator is locked up while an error message is shown on the display to indicate the cause of the error.

- Press **CLEAR** to clear the error.

Error Message	Cause
ARUGMENT Error	Improper use of an argument
DIVIDE BY 0 Error	An attempt to perform a calculation divided by 0 Or in STAT mode, no. of input data $\leq 1$
DOMAIN Error	<ul style="list-style-type: none"> <li>• An attempt to perform a illogical operation For example:               <ul style="list-style-type: none"> <li>• <math>\log x</math> or <math>\ln x</math>, <math>x=0</math></li> <li>• <math>\tan x</math>, <math>x=90^\circ, -90^\circ, 270^\circ, -270^\circ, 450^\circ, -450^\circ</math>, etc.</li> <li>• <math>x!</math>, <math>x</math> is not an integer <math>\geq 0</math></li> <li>• <math>nCr</math> or <math>nPr</math>: <math>n</math> and <math>r</math> are not an integer <math>\geq 0</math></li> </ul> </li> </ul>
FRQ DOMAIN Error	In STAT 1-VAR mode, FRQ value is not an integer or $0 <$ or $> 99$
OVERFLOW Error	An attempt to perform a calculation using a value that exceeds the allowable input range Or calculation result is outside the allowable calculation range
STAT Error	In STAT mode, no defined data points after pressing <b>STAT</b> . Or in mode other than STAT mode, press <b>DATA</b> , <b>STAT</b> or <b>2nd</b> <b>EXITSTAT</b>
SYNTAX Error	An attempt to perform a problematic format of the calculation For example: <ul style="list-style-type: none"> <li>• Misplaced functions, parentheses or commas</li> </ul>

## BASIC CALCULATIONS

### Arithmetic Calculations



- To calculate negative values (excludes the negative exponent), make sure that the values are enclosed with parentheses.
- To input negative values, use  $\pm$ .

Calculation Expression	Operation	Display (Result)
$(-2.5)^2$	( $\pm$ 2 . 5 ) $x^2$ =	6.25
$(4 \times 10^{75})(-2 \times 10^{-79})$	4 2nd EE 7 5 x $\pm$ 2 2nd EE $\pm$ 7 9 =	-0.0008

- You can omit the close parenthesis  $)$  if the calculation ends with  $=$  or if the values are stored in memory variables.

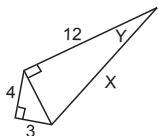
Calculation Expression	Operation	Display (Result)
$(\tan -45) \div (-2)$	tan $\pm$ 4 5 ) $\div$ $\pm$ 2 =	0.5
$\tan (-45 \div -2)$	tan $\pm$ 4 5 $\div$ $\pm$ 2 =	0.414213562

! [SYNTAX Error] will appear if the number of  $)$  is higher than the number of  $($ .

## Memory Variables

- There are 5 Memory Variables (A, B, C, D and E) which are used for storing data, results, or dedicated values.
- To store values in memory, press  + Memory Variable.
- To recall a previous calculation in memory, press   + Memory Variable.
- To clear all memory values, press  .
- To input memory variables, press  , select variable using   and then press  .

**Example:** Calculate hypotenuse X and angle Y



Operation	Display (Upper)	Display (Lower)
<input type="button" value="3"/> <input type="button" value="STO"/> <input type="button" value="="/> <input type="button" value="4"/> <input type="button" value="STO"/> <input type="button" value="→"/> <input type="button" value="="/>	4 → B	4.
<input type="button" value="2nd"/> <input type="button" value="√"/> <input type="button" value="MEM"/> <input type="button" value="="/> <input type="button" value="x²"/> <input type="button" value="+"/> <input type="button" value="MEM"/> <input type="button" value="→"/> <input type="button" value="="/> <input type="button" value="x²"/> <input type="button" value="="/>	$\sqrt{A^2+B^2}$	5.
Calculate X <input type="button" value="STO"/> <input type="button" value="="/> <input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="STO"/> <input type="button" value="→"/> <input type="button" value="="/> <input type="button" value="↑"/> <input type="button" value="↑"/> <input type="button" value="↑"/> <input type="button" value="="/>	12 → B $\sqrt{A^2+B^2}$	12. 13.
Calculate Y <input type="button" value="2nd"/> <input type="button" value="tan&lt;sup&gt;-1&lt;/sup&gt;"/> <input type="button" value="2nd"/> <input type="button" value="RCL"/> <input type="button" value="="/> <input type="button" value="a/b/c"/> <input type="button" value="2nd"/> <input type="button" value="RCL"/> <input type="button" value="→"/> <input type="button" value="="/> <input type="button" value="="/>	$\tan^{-1}(5 \div 12)$	22.61986495

## Answer Memory

- The inputted values or the most recent calculation result is automatically stored in Answer Memory when you press  $\boxed{=}$ ,  $\boxed{\text{STO}}$  followed by a Memory Variable or entering Base-n mode ( $\boxed{2\text{nd}}$   $\boxed{\text{HEX}}$  /  $\boxed{\text{DEC}}$  /  $\boxed{\text{OCT}}$  /  $\boxed{\text{BIN}}$ ).
- If you continuously press an operator key ( $x^2$ ,  $^$ ,  $x\sqrt{\quad}$ ,  $\%$ ,  $x^{-1}$ ,  $+$ ,  $-$ ,  $\times$ ,  $\div$ ,  $n\text{Pr}$ ,  $n\text{Cr}$ ,  $x!$ ,  $\blacktriangleright\text{DMS}$ , degree ( $^\circ$ ), radians (r) or gradient (g)), the displayed value change to into [Ans] plus the operator key. You can then perform a new calculation with the latest Answer Memory.

Operation	Display (Upper)	Display (Lower)
$\boxed{1} \boxed{2} \boxed{3} \boxed{+} \boxed{4} \boxed{5} \boxed{6} \boxed{=}$ $\boxed{x^2} \boxed{=}$	123+456 Ans <sup>2</sup>	579. 335241.

- You can recall and use the latest stored Answer Memory by pressing  $\boxed{2\text{nd}}$   $\boxed{\text{ANS}}$ .

Operation	Display (Upper)	Display (Lower)
$\boxed{7} \boxed{8} \boxed{9} \boxed{9} \boxed{0} \boxed{0} \boxed{-}$ $\boxed{2\text{nd}} \boxed{\text{ANS}} \boxed{=}$	789900- <u>Ans</u>	454659.

! Answer Memory is not updated if an error occurs in the operation.

## Constant Memory

Constant memory can store a combination of numbers, operators and/or values. When Constant Memory is enabled, the stored operation will apply to the previous result or the current entry by subsequently pressing  $\boxed{=}$ .

**Example:** Calculate  $12 \times 8$ ,  $2.4 \times 8$  and  $7 \times 8$

Operation	Display (Upper)	Display (Lower)
$\boxed{2\text{nd}} \boxed{\text{K}} \boxed{\times} \boxed{8} \boxed{=}$ (Enable and store constant memory)	K=x8	
$\boxed{1} \boxed{2} \boxed{=}$	12x8	96.
$\boxed{2} \boxed{\cdot} \boxed{4} \boxed{=}$	2.4x8	19.2
$\boxed{7} \boxed{=}$	7x8	56.
$\boxed{2\text{nd}} \boxed{\text{K}}$ (Clear constant memory)		

## Fraction Operations



The calculator supports calculations with fractions and conversions between Decimal and Fractional display and between Mixed and Improper fractions.

Example	Operation	Display (Lower)
Fraction Calculation	$2 + \frac{1}{3} = \frac{7}{3}$	$3 \frac{1}{3}$
Mixed and Improper Fraction Conversion	$2 \text{nd} \frac{10}{3} =$	$10 / 3$
Fraction and Decimal Conversion	$2 \text{nd} \text{F}\leftrightarrow\text{D} =$	$3.333333333$

- Result will automatically display in decimal or fraction format automatically.
- The result of a calculation involving both a fraction and decimal value will display in decimal format.
- Fraction conversions may take up to two seconds.

## Percentage Calculations



To calculate a certain percentage of a value ( $A \times B \text{ 2nd } \% =$ ).

Example	Operation	Display (Upper)	Display (Lower)
To calculate 25% of 820	$820 \times 25 \text{ 2nd } \% =$	$820 * 25\%$	$205.$

## Degrees-Minutes-Seconds Calculations



The Degrees(hours)-Minutes-Seconds key can be used to perform a sexagesimal (base-60 notational system) calculation or convert the sexagesimal value into decimal value.

### Degrees-Minutes-Seconds ↔ Decimal points

Example	Operation	Display (Lower)
$86^{\circ}37'34.2'' \div 0.7 =$	$86 \text{ DMS} \div 0.7 =$	$123.7516667$
Result → DMS format	$123.7516667 \text{ DMS} =$	$123^{\circ}45'6''$

## Angle Unit Conversion

The default calculator setting for Angle Unit is "Degree". To change the angle units to "Radian" or "Gradient", press **DRG** for the setup screen to appear.



Next press **→** / **←** and then press **⇨** for the angle unit you want to use. The display will then show the DEG, RAD or GRAD indicator accordingly.

To convert an angle unit between "Degree", "Radian" and "Gradient", press **◻◻◻**, **→** / **←** and **⇨** into the selected angle unit. To indicate the value using another degree unit, change the unit by pressing **DRG**.

**Example:** Converting 180 degree into radian and gradient  
 $(180^\circ = \pi^r = 200^g)$

Operation	Display (Upper)	Display (Lower)
<b>1</b> <b>8</b> <b>0</b> <b>◻◻◻</b> <b>⇨</b> <b>DRG</b> <b>→</b> <b>⇨</b> (Radian mode) <b>⇨</b>	180°	3.141592654 RAD
<b>DRG</b> <b>→</b> <b>⇨</b> (Gradient mode) <b>⇨</b>	180°	200. GRAD



# FUNCTIONAL SCIENTIFIC CALCULATIONS

## Square, Root, Power, Power Root, Reciprocal and Pi

$x^2$ Square	$\sqrt{\quad}$ Root	$\wedge$ Power
$\sqrt[n]{\quad}$ Power Root	$x^{-1}$ Reciprocal	$\pi$ Pi

### Pi

Calculation :  $\pi = 3.141592653589793$

Display :  $\pi = 3.141592654$

**Example :**  $\sqrt{(-2)^2 + 5^3} \times \pi + (\sqrt[3]{27} - 4)^{-1} = 34.68163348$

Operation	Display (Upper)	Display (Lower)
$2^{nd}$ $\sqrt{\quad}$ ( $\frac{\square}{\square}$ 2 ) $x^2$ $+$ 5 $\wedge$ 3 ) $\pi$ + ( 3 $2^{nd}$ $\sqrt[n]{\quad}$ 2 7 - 4 ) $x^{-1}$ =	$\sqrt{((-2)^2 + 5^3}$	34.68163348

## Trigonometry Calculations

$\sin$   $\cos$   $\tan$   $\sin^{-1}$   $\cos^{-1}$   $\tan^{-1}$  HYP

- Before using the trigonometric functions (except hyperbolic calculations), press  $\text{DRG}$  to select the appropriate angle unit (Deg/ Rad/ Grd).
- $90^\circ$  (Deg) =  $\pi/2$  (Rad) = 1009 (Grd)

### Trigonometric ( $\sin/\cos/\tan$ ), Inverse Trigonometric ( $\sin^{-1}/\cos^{-1}/\tan^{-1}$ ) Functions

Examples	Operation	Display (Lower)
Degree Mode	$\text{DRG}$ $\rightarrow$ / $\leftarrow$ (DEG) =	
$\sin 53^\circ 22' 12'' = 0.802508183$	$\sin$ 5 3 $\circ \prime \prime$ = 2 2 $\circ \prime \prime$ $\rightarrow$ = 1 2 $\circ \prime \prime$ $\rightarrow$ $\rightarrow$ = =	0.802508183
$\tan^{-1}(5/6) = 39.80557109$	$2^{nd}$ $\tan^{-1}$ 5 $a/b/c$ 6 =	39.80557109
Radian Mode	$\text{DRG}$ $\rightarrow$ =	
$\cos(\pi/6) = 0.866025404$	$\cos$ $\pi$ $\div$ 6 =	0.866025404
$\cos^{-1} 1/\sqrt{2}$ $= 0.785398163$ $= 0.25\pi$ (Rad)	$2^{nd}$ $\cos^{-1}$ 1 $\div$ $2^{nd}$ $\sqrt{\quad}$ 2 = $\div$ $\pi$ =	0.785398163  0.25

## Hyperbolic (sinh/ cosh/ tanh), Inverse Hyperbolic (sinh<sup>-1</sup>/ cosh<sup>-1</sup>/ tanh<sup>-1</sup>) Functions

Examples	Operation	Display (Lower)
sinh 2.5 – cosh 2.5 = -0.082084999	<b>2nd</b> $\frac{\text{HYP}}$ <b>sin</b> <b>2</b> <b>.</b> <b>5</b> <b>)</b> <b>-</b> <b>2nd</b> $\frac{\text{HYP}}$ <b>cos</b> <b>2</b> <b>.</b> <b>5</b> <b>=</b>	-0.082084999
cosh <sup>-1</sup> 45 = 4.499686191	<b>2nd</b> $\frac{\text{HYP}}$ <b>2nd</b> $\frac{\text{cos}^{-1}}$ <b>4</b> <b>5</b> <b>=</b>	4.499686191

## Logarithm, Natural Logarithm and Antilogarithm

**LOG** **LN**  $e^x$   $10^x$

Examples	Operation	Display (Lower)
log 255 + ln 3 = 3.505152469	<b>LOG</b> <b>2</b> <b>5</b> <b>5</b> <b>)</b> <b>+</b> <b>LN</b> <b>3</b> <b>=</b>	3.505152469
e <sup>-3</sup> + 10 <sup>1.2</sup> = 15.89871899	<b>2nd</b> $e^x$ $\frac{1}{\square}$ <b>3</b> <b>)</b> <b>+</b> <b>2nd</b> $10^x$ <b>1</b> <b>.</b> <b>2</b> <b>=</b>	15.89871899

## Coordinate Conversion

$R \leftrightarrow P$

With polar coordinates, you can calculate and display result  $\theta$  within  $-180^\circ \leq \theta < 180^\circ$  range. (Same as Radian and Gradient)

$R \leftrightarrow P$   $\frac{R \leftrightarrow P}{\square}$  : R>Pr & R>P $\theta$  to convert Rectangular Coordinates (x,y) to Polar Coordinates (r,  $\theta$ ).

**Example** : With Rectangular Coordinate (x=1, y= $\sqrt{3}$ ). Find Polar Coordinate (r,  $\theta$ ) at degree mode.

Examples	Operation	Display (Lower)
Degree Mode	<b>DRG</b> $\rightarrow$ / $\leftarrow$ (DEG) <b>=</b>	
Calculate Radius (r) = 2	<b>2nd</b> $\frac{R \leftrightarrow P}{\square}$ (R>Pr) <b>=</b> <b>1</b> <b>2nd</b> $\sqrt{\square}$ <b>2nd</b> $\sqrt{\square}$ <b>3</b> <b>=</b>	2.
Calculate Polar Angle ( $\theta$ ) = 60°	$\wedge$ <b>2nd</b> $\frac{R \leftrightarrow P}{\square}$ $\rightarrow$ (R>P $\theta$ ) <b>=</b> <b>=</b>	60.

**R $\leftrightarrow$ P** : P>Rx & P>Ry to convert Polar Coordinates (r,  $\theta$ ) to Rectangular Coordinates (x,y).

**Example** : In Degree mode, express the point defined by Polar Coordinates (r=2,  $\theta=60^\circ$ ) in Rectangular Coordinates (x,y).

Examples	Operation	Display (Lower)
Calculate x-coordinate = 1	<b>2nd</b> $R\leftrightarrow P$ $\rightarrow$ $\rightarrow$ (P>Rx) $=$ <b>2</b> <b>2nd</b> $\angle$ <b>6</b> <b>0</b> $=$	1.
Calculate y-coordinate = $\sqrt{3}$	$\wedge$ <b>2nd</b> $R\leftrightarrow P$ $\rightarrow$ $\rightarrow$ $\rightarrow$ (R>P $\theta$ ) $=$ $=$	1.732050808.

! [ARGUMENT Error] will appear if  $\angle$  is missing from the coordinate conversion calculation.

## Base-n Calculations and Logical Calculations

- Press **2nd**  $\text{BIN}$  /  $\text{OCT}$  /  $\text{DEC}$  /  $\text{HEX}$  to select and enter Base-n mode for Binary (base 2), Octal (base 8), Decimal (base 10) or Hexadecimal (base 16).
- In Binary, Octal, and Hexadecimal mode, logical operators allow you to perform logical calculations including: Logic Connection [AND] / [OR], Exclusive Or [XOR], Exclusive Nor [XNOR], Argument Complement [NOT] and Negation [NEG].
- In Binary, Octal and Hexadecimal mode, all scientific functions cannot be used, and values with decimal place or exponents cannot be inputted. In Decimal mode, scientific calculations can be performed and decimal place is rounded down when performing Base-n transformation.

Basic arithmetic operations using binary, octal, decimal and hexadecimal values:

**Example:**  $0011_2 + 11010_2 = 11101_2$

Operation	Display (Upper)	Display (Lower)
<b>2nd</b> $\text{BIN}$		b
<b>1</b> <b>1</b> <b>+</b> <b>1</b> <b>1</b> <b>0</b> <b>1</b> <b>0</b> $=$	11+11010	11101 <sup>b</sup>

**Example:**  $12_8 + 5_8 \times 2_8 = 24_8$

Operation	Display (Upper)	Display (Lower)
<b>CLEAR</b> <b>2nd</b> <b>OCT</b>		0
<b>1</b> <b>2</b> <b>+</b> <b>5</b> <b>x</b> <b>2</b> <b>=</b>	12+5x2	24 <sup>o</sup>

**Example:**  $10_{10} \div 2_{10} = 5_{10}$

Operation	Display (Upper)	Display (Lower)
<b>CLEAR</b> <b>2nd</b> <b>DEC</b>		
<b>1</b> <b>0</b> <b>÷</b> <b>2</b> <b>=</b>	10/2	5.

**Base-n transformation** **HEX** **DEC** **OCT** **BIN**

Operation	Display (Upper)	Display (Lower)
<b>CLEAR</b> <b>2nd</b> <b>BIN</b>		b
<b>1</b> <b>1</b> <b>+</b> <b>1</b> <b>1</b> <b>0</b> <b>1</b> <b>0</b> <b>=</b>	11+11010	11101 <sup>b</sup>
<b>2nd</b> <b>OCT</b>	Ans → OCT	35 <sup>o</sup>
<b>2nd</b> <b>DEC</b>	Ans → DEC	29.
<b>2nd</b> <b>HEX</b>	Ans → HEX	1d <sup>H</sup>

**Logical Operation** **NOT** **AND** **OR** **XOR** **XNOR** **NEG(-)**

Examples (Hexadecimal Mode)	Operation	Display (Lower)
789ABC XNOR 147258	<b>CLEAR</b> <b>2nd</b> <b>HEX</b> <b>7</b> <b>8</b> <b>9</b> <b>A</b> <b>B</b> <b>C</b> <b>XNOR</b> <b>1</b> <b>4</b> <b>7</b> <b>2</b> <b>5</b> <b>8</b> <b>=</b>	FFFF93171b <sup>H</sup>
Ans OR 789ABC	<b>2nd</b> <b>ANS</b> <b>OR</b> <b>7</b> <b>8</b> <b>9</b> <b>A</b> <b>B</b> <b>C</b> <b>=</b>	FFFFFb9FbF <sup>H</sup>
NEG 789ABC	<b>NEG(-)</b> <b>7</b> <b>8</b> <b>9</b> <b>A</b> <b>B</b> <b>C</b> <b>=</b>	FFFF876544 <sup>H</sup>

! Beware of the allowable input range of each number system (page 8).

! Logical Operation does not support Decimal Mode.

## Permutation, Combination, Factorials and Random Number Generation

- Permutation :  $nPr = \frac{n!}{(n-r)!}$
- Combination :  $nCr = \frac{n!}{r!(n-r)!}$
- Factorial :  $x! = x(x-1)(x-2).....(2)(1)$

Examples	Operation	Display (Lower)
${}_{10}P_3$	<span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">PRB</span> (nPr) <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">=</span>	720.
${}_5C_2$	<span style="border: 1px solid black; padding: 2px;">5</span> <span style="border: 1px solid black; padding: 2px;">PRB</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">➤</span> (nCr) <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">=</span>	10.
$5!$	<span style="border: 1px solid black; padding: 2px;">5</span> <span style="border: 1px solid black; padding: 2px;">PRB</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">➤</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">➤</span> (!) <span style="border: 1px solid black; padding: 2px;">=</span>	120.

### Random Number Generation

#### RAND:

- PRB ⬅ ⬅ : To generate a random number between 0 and 1.  
 \* Using seed value by storing an integer to rand  
 ( STO ⬅ = ) to control a sequence of random numbers.

#### RANDI:

- PRB ⬅ : To generate a random integer between two specified integers. Results differ each time with the same possibility occurrence within a boundary. The entry is divided with " , ".

#### Example:

Operation	Display (Upper)	Display (Lower)
<span style="border: 1px solid black; padding: 2px;">PRB</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">⬅</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">⬅</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">=</span>	RAND	0.298023224*
<span style="border: 1px solid black; padding: 2px;">PRB</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">⬅</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">2nd</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">⏏</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">=</span>	RANDI (1,100	15.*

\* The value is only a sample, results will differ each time.

## STATISTICAL CALCULATIONS

- To enter the statistical mode, press **2nd** **STAT**. Then press **≡** (1-VAR) to enter one-variable mode, or press **➤** **≡** (2-VAR) to enter two-variable mode. The linear regression equation  $y = Ax + B$  is represented in two variables.
- Before starting a new statistic data entry, be sure to clear the statistic memory by pressing **2nd** **STAT** **◀** **≡** (CLRDATA).
- Perform data input and edit:
  - Press **DATA** to register data
    - In 1-VAR mode:
      - Input first data for X1.
      - Press **▼** to save and to set the frequency of occurrence (FRQ).
      - Frequency of occurrence default is set to 1 (FRQ=1). Input data value when needed.
      - Press **▼** to save and to enter the next data (X2) for input.
      - Repeat these steps by pressing **▼** to input the data value and set the FRQ until finished.
      - Press **≡** or **▼** to save the last entered data point or FRQ value.
    - In 2-VAR mode:
      - Input first data for X1.
      - Press **▼** to save and set the Y1 value.
      - Y value default is set to 1 (Y=1). Input data value when needed.
      - Press **▼** to save and enter the next data (X2) input value.
      - Repeat these steps by pressing **▼** to input data value for X and Y until finished.
      - Press **≡** or **▼** to save the last entered data point.
  - To edit data, press **▲** or **▼** to migrate to that value. After inputting the new value, press **≡** or **▼** to save.
  - You can press **DATA** to return to a STAT mode screen for other calculations. Calculations in blank STAT mode screen will not be stored in statistic memory.
- After finishing all data entries, press **STAT** to calculate the statistic functions.

- You can recall the following statistic values by pressing  $\leftarrow$  and  $\rightarrow$ , and select a variable by pressing  $\equiv$  to evaluate the calculation.

Variables	Explanations
<b>n</b>	Total number of <b>x</b> or <b>(x,y)</b> (2-VAR) data points
$\bar{x}$ or $\bar{y}$	Mean of all <b>x</b> or <b>y</b> (2-VAR) values
<b>Sx</b> or <b>Sy</b>	Sample standard deviation of <b>x</b> or <b>y</b> (2-VAR)
$\sigma_x$ or $\sigma_y$	Population standard deviation of <b>x</b> or <b>y</b> (2-VAR)
$\Sigma x$ or $\Sigma y$	Sum of all <b>x</b> or all <b>y</b> (2-VAR) values
$\Sigma x^2$ or $\Sigma y^2$	Square sum of all <b>x</b> or <b>y</b> (2-VAR) values
$\Sigma xy$	Sum of all multiply <b>x</b> and <b>y</b> pairs in 2-VAR mode
<b>a</b>	Linear regression of slope in 2-VAR mode
<b>b</b>	Linear regression of <b>y</b> -intercept in 2-VAR mode
<b>r</b>	Correlation coefficient in 2-VAR mode
<b>x'</b>	Uses linear regression to calculate <b>x</b> value when input a <b>y</b> value in 2-VAR mode
<b>y'</b>	Uses linear regression to calculate <b>y</b> value when input a <b>x</b> value in 2-VAR mode

- To clear all entered data without exiting STAT mode, press **2nd**  $\frac{\text{STAT}}{\text{O}}$   $\leftarrow$   $\equiv$  (CLRDATA).
- To clear all entered data and to exit STAT mode, press **2nd**  $\frac{\text{EXITSTAT}}{\text{O}}$   $\equiv$  (EXIT ST: Y).
- Changing into another mode will clear all entered data.

**Example:** To calculate  $n$ ,  $\bar{x}$ ,  $\sigma x$  and variance of a population ( $\sigma x^2$ ) of data: 75, 85, 90, 77, 77 in one-variable mode.

Operation	Display (Upper)	Display (Lower)
<b>2nd</b> STAT $\frac{\square}{\square}$ (1-VAR)		
<b>2nd</b> STAT $\leftarrow$ $\frac{\square}{\square}$ (CLRDATA)		
DATA	X1=	
7 5 $\downarrow$ $\downarrow$ 8 5 $\downarrow$ $\downarrow$ 9 0 $\downarrow$ $\downarrow$ 7 7 $\downarrow$ 2 $\downarrow$	X5=	
<b>STATVAR</b>	$n$ $\bar{x}$ $Sx$ $\sigma x$	5.
$\rightarrow$	$n$ $\bar{x}$ $Sx$ $\sigma x$	80.8
$\rightarrow$ $\rightarrow$	$n$ $\bar{x}$ $Sx$ $\underline{\sigma x}$	5.741080038
$\frac{\square}{\square}$	$\sigma x$	
$x^2$ $\frac{\square}{\square}$	$\sigma x^2$	32.96

**Example:** To calculate correlation coefficient ( $r$ ) and  $x$  value when  $y =$  data set of 10: (20,20), (30,26), (40,30)


Operation	Display (Upper)	Display (Lower)
<b>2nd</b> STAT $\rightarrow$ $\frac{\square}{\square}$ (2-VAR)		
DATA	X1=	
2 0 $\downarrow$ 2 0 $\downarrow$ 3 0 $\downarrow$ 2 6 $\downarrow$ 4 0 $\downarrow$ 3 0 $\downarrow$	X4=	
<b>STATVAR</b>	$n$ $\bar{x}$ $Sx$ $\sigma x$ $\bar{y}$	3.
$\leftarrow$ $\leftarrow$ $\leftarrow$	$\Sigma xy$ $a$ $b$ $r$	0.993399268
$\rightarrow$	$x'$ $y'$	
$\frac{\square}{\square}$	$x'$ (	
1 0 $\frac{\square}{\square}$	$x'$ (10	-0.666666667
<b>2nd</b> EXITSTAT $\frac{\square}{\square}$		

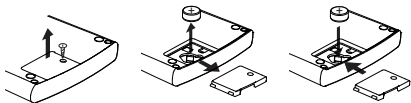


## BATTERY REPLACEMENT

When the display characters are dim, turn off the calculator and immediately replace the alkaline battery.

Please replace the alkaline battery using the following procedure:

1. Press **2nd**  to power off the calculator.
2. Remove the screw that secures 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 the positive "+" side facing up.
6. Replace the battery cover, tighten the screw, and use the tip of a ballpoint pen (or similar sharp object) to press the [RESET] button on the back of the calculator 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 **2nd**    to restart the calculator.

## 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.
- Continued use of the calculator in a 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.

## SPECIFICATIONS

- Power Supply : Solar Cell and alkaline battery (LR44 x 1)  
Power Consumption : DC1.5V / 0.038mW  
Battery Life : Approximately 3 years  
(Based on 1 hour operation per day)  
Auto power off : Approx. 7 minutes  
Operation Temperature : 0° ~ 40° C (32° F ~ 104° F)  
Size: 158 (L) x 81 (W) x 18 (H) mm (with cover)  
6-7/32" x 3-3/16" x 45/64" (with cover)  
Weight : 109g (3.7 oz) with cover  
\* Specifications are subject to change without notice

## CANON CONSUMER CALCULATOR LIMITED WARRANTY

The limited warranty set forth below is given by Canon Canada Inc., (Canon Canada) with respect to Calculators purchased and used in the Canada respectively.

This limited warranty is only effective upon presentation of proof of purchase (bill of sale) to Canon Canada Factory Service Center. Canon Calculators, when delivered to you in a new condition in the original container, are warranted against defective materials or workmanship as follows: for a period of one (1) year from the date of original purchase, defective parts or Calculators returned to a Canon Canada Factory Service Center and proven to be defective upon inspection, will be exchanged at Canon Canada's sole option, for new or comparable rebuilt parts or calculators (of the same or similar model). Warranty for replacement shall not extend the original warranty period of the defective calculator.

When returning Calculators under this limited warranty, you must pre-pay the shipping charges, if any, and enclose a complete explanation of the problem. Calculators covered by this limited warranty will be repaired at Canon Canada's sole option, and returned to you without charge by any Canon Canada Service Center. This warranty does not cover rechargeable batteries that may be supplied with the Calculator, as to which batteries there shall be no warranty or replacement.

Information Technology Services and Canon Canada Information/Service Center will refer you to the nearest Factory Service Center. Repairs not under warranty will be at such cost as Canon Canada may from time to time generally establish.

This limited warranty covers all defects encountered in normal use of the calculators, and does not apply in the following cases:

- (a) Loss or damage to the Calculators due to abuse, mishandling, alteration, accident, electrical current fluctuations, failure to follow operating instructions, maintenance and environmental instructions prescribed in Canon Canada's instruction manual or service performed by other than a Canon Canada Factory Service Center.
- (b) Use of parts (other than those distributed by Canon Canada) which damage the Calculator or cause abnormally frequent service calls or service problems.
- (c) If any Calculator has had its serial numbers or dating altered or removed.
- (d) Loss or damage to the Calculator due to leaking batteries (other than rechargeable batteries supplied as original equipment with the Calculator by Canon Canada) or water damage.

NO IMPLIED WARRANTY (OR CONDITION)\* INCLUDING ANY IMPLIED WARRANTY (OR CONDITION)\* OF MERCHANTABILITY

OR FITNESS FOR A PARTICULAR PURPOSE, APPLIES TO THE CALCULATORS AFTER THE APPLICABLE PERIOD OF EXPRESS WARRANTY STATED ABOVE, AND NO OTHER EXPRESS WARRANTY OR GUARANTY, EXCEPT AS MENTIONED ABOVE, GIVEN BY ANY PERSON, FIRM OR CORPORATION WITH RESPECT TO THE CALCULATORS SHALL BIND CANON CANADA. (SOME STATES OR PROVINCES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.) CANON CANADA SHALL BE LIABLE FOR LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS OR OTHER BENEFITS, OR FOR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY THE USE, MISUSE OR INABILITY TO USE THE CALCULATOR, REGARDLESS OF THE LEGAL THEORY ON WHICH THE CLAIM IS BASED, AND EVEN IF CANON CANADA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NOR SHALL RECOVERY OF ANY KIND AGAINST CANON CANADA BE GREATER IN AMOUNT THAN THE PURCHASE PRICE OF THE CALCULATOR SOLD BY CANON CANADA AND CAUSING THE ALLEGED DAMAGE. WITHOUT LIMITING THE FOREGOING, YOU ASSUME ALL RISK AND LIABILITY FOR LOSS, DAMAGE OR INJURY TO YOU AND YOUR PROPERTY AND TO OTHERS AND THEIR PROPERTY ARISING OUT OF USE, MISUSE OR INABILITY TO USE ANY CALCULATOR SOLD BY CANON CANADA NOT CAUSED DIRECTLY BY THE NEGLIGENCE OF CANON CANADA. (SOME STATES OR PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.) THIS LIMITED WARRANTY SHALL NOT EXTEND TO ANYONE OTHER THAN THE ORIGINAL PURCHASER OF ANY CALCULATOR OR THE PERSON FOR WHOM IT WAS PURCHASED AS A GIFT AND STATES YOUR EXCLUSIVE REMEDY.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province.

Canon Canada Inc.

8000 Mississauga Road, Brampton, Ontario L6Y 5Z7 CANADA

Please keep a copy of your original bill of sale. In order to obtain warranty service, you will need to present a copy of your original bill of sale from your Consumer Calculator retailer at the time of service. Also please keep all packing materials and the original packing box to protect your equipment, should you need to transport it for service.

Canon Information/Service Centers in Canada

Should service be necessary, please call 1 800-OK-CANON for information regarding the nearest Authorized Service Facility:

Canon Canada Inc. 2828 16th Street, N.E. Calgary, Alberta T2E 7K7

Canon Canada Inc. 5990 ch Côte-de-Liesse, Montréal, Québec H4T 1V7

Canon Canada Inc. 8000 Mississauga Road, Brampton, Ontario L6Y 5Z7

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