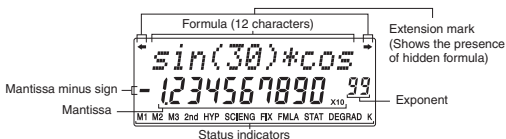


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Two-Line Display



<Status indicators>

- M1, M2, M3 : Memory Storage
- 2nd : 2nd Function
- HYP : Hyperbolic
- SCI : Scientific Exponential Mode
- ENG : Engineering Exponential Mode
- FIX : Fixing Mode
- FMLA : Built-in Formular
- STAT : Statistic Mode
- DEG : Degree Mode
- GRAD : Gradient Mode
- RAD : Radian Mode
- K : Constant
- x10 : Precedes the exponent

<Display description in this book>


In the example table, the upper line display will be shown as "xx" (e.g. "Ans").

Precautions Before Calculation

- Calculation Mode
Before starting calculation, be sure to check the Calculation mode from the status indicators, such as STAT (static) and DEG (degree).
- Returning to the Initial Mode
If you get into trouble during calculation, it is recommended to return the calculation mode to the initial one once, where only "DEG (Degree)" indicator is lit.
- If you get into trouble, you can use the reset key which will reset the calculator to the Decimal Calculation/Floating mode.



Power ON, OFF Keys



 **(Power ON/Clear):** Turns the calculator on. When it is pressed, the calculator will be turned on.

- **Auto Power Off Function:**

When the calculator is not used for about **7 minutes**, the calculator is automatically turned off to save power.

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

Numeric Entry Keys

- 0** ~ **9** (**Numeric**): Enter numbers.
- .** (**Decimal Point**): Enters a decimal point.
- EE** (**Exponential**): Used to enter exponents.
Example: $35 \times 10^{43} = \rightarrow 35$ **EE** **43** **=** (3.5×10^{44})
- (-)** (**Negative**): Used to obtain negative value.
Example: $12 \times (-3) = \rightarrow 12$ **×** **(-)** **3** **=** $(-36.)$
- BS** (**Back Space**): Clears the last digit entered from the upper (formula) line.

Example:

Value	Operation	Display
12345	1 2 4 incorrect entry	"124"
	BS	"12"
	3 4 5	"12345"

2nd Functions Keys

2nd

For performing function indicated above the keys.

Example: $\sin^{-1} 0.5 \rightarrow$ **2nd** **SIN⁻¹** **.** **5** **2** **=** $(30.)$

Memory Keys

STO **RCL** **EXC** **SUM**

The calculator has 3 memories. When a memory contains a number other than 0, **M1**, **M2**, or **M3** displays.

Example:

	Operation	Display
STO Stores displayed value in memory M1 , M2 or M3 , replacing current value.	45 STO 1 + 27 =	Ans \rightarrow STO M1 45. Ans+27 72
RCL Recalls value in memory M1 , M2 or M3	(continued) RCL 1 + 3 =	45. 45+3 48.
2nd SUM Adds displayed value to memory M1 , M2 or M3	(continued) 12 2nd SUM 1	Ans \rightarrow sum M1 12
2nd EXC Exchanges displayed and memory values.	(continued) 24 × 8 = 2nd EXC 1 RCL 1	24 \times 8 Ans \rightarrow EXC M1 192 57

****To clear a single memory, press 0 **STO** 1, 0 **STO** 2, or 0 **STO** 3.**

Cursor/Edit Keys



The cursor keys are used to move the cursor in the upper (formula entry) line. When the entry is long, an extension mark appears to let you know that the hidden formula is present.

With **DEL** (deletion) and **INS** (insertion), you can correct the formula during entry or after calculation. Also, after calculation comma you can use the replay function to move the cursor to the end or beginning of the formula to add further formula or to change it.

Example:

1234567 **+** 889900

◀ 567+889900 ▶

Extension mark Cursor

Replacing an entry (7 → 0):

← (Press or keep press until "7" blinks.)

1234567+889 ▶

0 (Replace with "0")

1234560+889 ▶

Deletion (1234560 → 134560):

← (Press or keep press until "2" blinks.)

1234560+889 ▶

DEL ("2" is deleted.)

134560+889 ▶

Insertion (889900 → 2889900):

→ (Press or keep press until "8" blinks.)

134560+8899 ▶

2nd **INS** ("8" and **[]** alternates.)

134560+8899 ▶

2 (Insert "2")

134560+2889 ▶

= (or **←** or **→**)

134560+2889 ▶

Replay function (You can add or change the formula):

= **→** (Cursor moves to the end.)

◀ 60+2889900 ▶

= **←** (Cursor moves to the beginning.)

134560+2889 ▶

Decimal Point Selection Keys



Specifies the number of decimal places in the mantissa of decimal calculation results. Pressing **0** ~ **9** after this key specifies the number of decimal places as follows:

2nd **FIX** **0** ~ **9** 0 ~ 9 decimal places

Note:

To reset the decimal specification, press **2nd**, **FIX**, then **0**.

Example:

Operation	Display	Explanation
2nd $\overline{\text{FIX}}$ 3	FIX	3 decimal places
1 2 3		
4 5 6		
7 8 9		
\times \cdot 0		
0 1 $=$	123456.789	
2nd $\overline{\text{FIX}}$ 0	123456 (*1)	0 decimal places
2nd $\overline{\text{FIX}}$ 5	123456.7890 (*2)	5 decimal places
2nd $\overline{\text{FIX}}$ \cdot	123456.789	Reset decimal places

*1 The displayed value is round off 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.

Notation Keys

2nd $\overline{\text{SCI}}$	Selects scientific notation.		
	12345 $=$		12345.
	2nd $\overline{\text{SCI}}$	SCI	1.2345×10^04
2nd $\overline{\text{ENG}}$	Selects engineering notation (exponent. is a multiple of 3). (continued)		
	2nd $\overline{\text{ENG}}$	ENG	12.345×10^03
2nd $\overline{\text{FLO}}$	Restores standard notation (floating-decimal) format.		

Display Contrast Adjustment

To adjust the display contrast, Press 2nd $\overline{\text{CONTRAST}}$ and one of the following means appear:



Press \leftarrow to make the display contrast darken.

Press \rightarrow to make the display contrast lighten.

Press ON/C to confirm.

Angle Unit Conversion Keys

2nd $\overline{\text{DRG}}$

Used to change the angle values to different unit.

$\overline{\text{DRG}}$ (DEG) \rightarrow (RAD) \rightarrow (GRAD)

2nd $\overline{\text{DRG}}$ Cycles (converts) angle-unit setting between degrees, radians, and grads for display, entry and calculation.

• Relationship of units: $200^{\text{GRAD}} = 180 = \frac{\text{RAD}}$

Example: Convert 180 degrees into radian and gradient.

Operation	Display(Upper)	Display(Lower)
180 $\boxed{2nd}$ $\boxed{DRG\blacktriangleright}$	"180 \rightarrow RAD"	3.141592654
$\boxed{2nd}$ $\boxed{DRG\blacktriangleright}$	"Ans \rightarrow GRAD"	200. RAD GRAD

Basic Instruction Keys

$\boxed{+}$ $\boxed{-}$ $\boxed{\times}$ $\boxed{\div}$ $\boxed{=}$: Used for basic arithmetic calculation. Press keys as they are written.

$\boxed{\times}$ **Can be omitted in the following cases:**

- Before parenthesis (e.g. $3(4+7)$, $(A+1)(B+2)$)
- Before $\sqrt{\quad}$, $\sqrt[3]{\quad}$, \sin , \sin^{-1} , \log , \ln , 10^x , e^x , (e.g. $2\sqrt{5}$)
- Before fixed number and variables (e.g. 2π , $3AB$)

$\boxed{\%}$ **(Percent):** Used for percentage calculations. When this key is pressed before using the four fundamental operations, the entered value is divided by 100 and the calculation result is displayed.

Example: $123 \boxed{2nd} \boxed{\%} \boxed{=}$ (1.23)

$\boxed{(}$ $\boxed{)}$ **(Open, Close Parenthesis):** For performing parenthesis calculations where numbers and instructions to be stored in the register are within 23 levels.

Example:

Value	Operation	Display
$2 \times (3+4) = 14$	$2 \boxed{(} 3 \boxed{+} 4 \boxed{)} \boxed{=}$	14.
$1 + [(4 - 3.6 + 5)$	$1 \boxed{+} \boxed{(} \boxed{(} 4 \boxed{-}$	
$\times 0.8 - 6] \times 4.2$	$3.6 \boxed{+} 5 \boxed{)} \boxed{\times} .8$	
	$\boxed{-} 6 \boxed{)} \boxed{\times} 4.2$	
$= -6.056$	$\boxed{=}$	-6.056

- $\boxed{(}$ and $\boxed{)}$ are always used together. Otherwise, "Syn (Syntax) ERROR" will be displayed.

Fractional Calculation Keys



It enters fractions and calculates both mixed and improper fractions. Answers are given in mixed fractions.

a^{bc} (**Fraction**): Use it to enter fractions for both mixed and improper fractions.

When entering improper fractions (A/B):

A (numerator) \rightarrow a^{bc} \rightarrow B (denominator)

When entering mixed fractions (A B/C):

A (integer) \rightarrow a^{bc} \rightarrow B (numerator) \rightarrow a^{bc} \rightarrow C (denominator)

Fractions 2/3 is displayed as "2 \downarrow 3", and 1 2/5 as "1 $_$ 2 \downarrow 5".

Example:

Value	Operation	Display(Lower)
$\frac{2}{3}$	2 a^{bc} 3 =	"2" "2 \downarrow " "2 \downarrow 3" 2 \downarrow 3
$1\frac{2}{5}$	1 a^{bc} 2 a^{bc} 5 =	"1 $_$ " "1 $_$ 2 \downarrow 5" 1 $_$ 2 \downarrow 5

- If the result exceeds 10 digits including delimiters, it is displayed in the decimal point expression.

<**Fractions** \longleftrightarrow **Decimal point expression**>

$F \leftrightarrow D$
 \square can convert the results of the fractional calculations to the decimal expression and vice versa.

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

Operation	Display(Lower)
1 a^{bc} 2 a^{bc} 3 $+$ 4 a^{bc} 5 a^{bc} 6 $=$	6 $_$ 1 \downarrow 2
\square $F \leftrightarrow D$	6.5
\square $F \leftrightarrow D$	6 $_$ 1 \downarrow 2

d/c (**Mixed/Improper Fraction Conversion**):

\square It converts mixed fractions to improper fractions and vice versa. It changes alternatively at each time the key is pressed.

Example: Enter 10/3 and convert it to the mixed fraction.

Operation	Display(Lower)
10 a^{bc} 3 $=$	3 $_$ 1 \downarrow 3
\square d/c	10 \downarrow 3

Last Answer Key

ANS



The result of the most recent calculation is stored into the answer memory. You can recall and use this result by pressing $\boxed{2\text{nd}} \boxed{\text{ANS}}$.

Example: Calculate $123 + 456$ and subtract the result from 789.

Operation	Display(Upper)	Display(Lower)
123 $\boxed{+}$ 456 $\boxed{=}$	"123+456"	579.
789 $\boxed{-}$ $\boxed{2\text{nd}}$ $\boxed{\text{ANS}}$ $\boxed{=}$	"789-Ans"	210.

Example using continuous calculation:

Operation	Display(Upper)	Display(Lower)
123 $\boxed{+}$ 456 $\boxed{=}$	"123+456"	579.
$\boxed{\div}$ 10 $\boxed{=}$	"Ans/10"	57.9

Calculation Priority

The calculation procedure priority is automatically determined by the calculator. This means that algebraic expressions can be entered just as they are written. The calculation priority is as follows:

1. Expressions inside parentheses.
2. Functions that need a) and precede that argument, such as sin, log...
3. Fractions.
4. Functions that are entered after the argument, such as x^2 , x^{-1} ...
5. Exponentiation (\wedge) and roots ($x \sqrt{\quad}$).
6. Negation (-).
7. Permutations (nPr) and combinations (nCr).
8. Multiplication, implied multiplication, division.
9. Addition and subtraction.
10. [=] completes all operations and closes all open parentheses. ;
Conversions (d/c, F \leftrightarrow D, DD \rightarrow DMS) ; R>P, P>R

Calculation Range

The allowable result display in the lower line is 10 digits for a mantissa and 2 digits for an exponent. However, calculations are internally performed with a range of 12 digits for a mantissa and 2 digits for an exponent.

Calculation range:

$1 \times 10^{-99} \sim 9.999999999 \times 10^{99}$, and 0

Error Messages

- ARGUMENT**— A function does not have the correct number of arguments.
- DIVIDE BY 0**
 - You attempted to divide by 0.
 - In statistics, $n=1$.
- DOMAIN**— You specified an argument to a function outside the valid range. For example:
 - For $\sqrt[y]{x}$: $0 < y < 0$ and x not an odd integer.
 - For y^x : $y < 0$ and $x=0$; $y < 0$ and x not an integer.
 - For \sqrt{x} : $x < 0$.
 - For LOG or LN: $X \leq 0$.
 - For TAN: $x=90, -90, 270, -270, 450$, etc.
 - For SIN⁻¹ or COS⁻¹: $|x| > 1$.
 - For nCr or nPr: n or r are not integers ≥ 0 .
 - For $x!$: x is not an integer between 0 and 69.
- EQUATION LENGTH ERROR**— An entry exceeds the digit limits (88 for Entry Line and 47 for Star or Constant Entry lines); for example, combining an entry with a constant that exceeds the limit.
- OVERFLOW**
 - $|\theta| \geq 1E10$, where θ is an angle in a trig, hyperbolic, or $R \rightarrow P$ (function).
 - Displaying when the entered value, executing result, memory sum x exceed $|X| > 9.999999999 \times 10^{99}$.
- STAT**
 - More than 9999 statistical data point.
 - Statistical data point x , where $|x| \geq 1E64$
 - [2nd][Σ^-] to remove the only data point.
 - Displaying when execute [Σ^-]/[CSR] but without data.
 - Calculating \bar{x} , σ_{xn} , or σ_{xn-1} with no data points or σ_{xn-1} with one data point.
- SYNTAX**— The command contains a syntax error: entering more than 23 pending operations or 8 pending values; or having misplaced functions, arguments, parentheses, or commas.

Statistical Calculations

- 1) Enter the first data and press $\Sigma+$ to enter the statistic mode.
"STAT" indicator lights up.
- 2) After finishing data entries, press a statistical calculation key (e.g. 2^{nd} \bar{x}) and then $=$.
- 3) Press 2^{nd} $\frac{CSR}{\square}$ displays the following menu to clear data values and exit statistic mode.
CLEAR? : Y N
 - Press $=$ when Y (yes) is underlined to clear data values and exit statistic mode.
 - Press $=$ when N (no) is underlined to return to the previous screen without exiting statistic mode.

Example: Enter data 5, 20, 20, 25, 25, and 25.

Operation	Display	Explanation
5 $\Sigma+$	"n=" 1.	DATA1 entry
20 $\Sigma+$	"n=" 2.	DATA2 entry
$\Sigma+$	"n=" 3.	DATA3 entry(*1)
25 2^{nd} $\frac{FRO}{\square}$ 3 $\Sigma+$	"n=" 6.	DATA4 – 6 entry(*2)
2^{nd} \bar{x} $=$	\bar{x} 20.	Find the mean
2^{nd} n $=$	n 6.	Find the number of data

*1 For the same data, you can simply press $\Sigma+$.

*2 For repeated data, you can use 2^{nd} $\frac{FRO}{\square}$ [number of times].

Output of Statistical Calculation Results

Output	Operation	Equation
Number of sample	2^{nd} n	-
Mean	2^{nd} \bar{x}	$\bar{x} = \sum_{i=1}^n x_i / n$
Standard deviation of sample	2^{nd} $\frac{\sigma_{X/N-1}}{\square}$	$\sigma_{X/N-1} = \sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 / (n-1)}$
Standard deviation population parameter	2^{nd} $\frac{\sigma_{X/N}}{\square}$	$\sigma_{X/N} = \sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 / n}$
Variance of sample	2^{nd} $\frac{\sigma_{X/N-1}^2}{\square}$ x^2	$V^{n-1} = \sum_{i=1}^n (x_i - \bar{x})^2 / (n-1)$
Variance of population	2^{nd} $\frac{\sigma_{X/N}^2}{\square}$ x^2	$V^n = \sum_{i=1}^n (x_i - \bar{x})^2 / n$
Sum	2^{nd} Σx	Σx
Square sum	2^{nd} Σx^2	Σx^2

Statistical Calculation Examples

You bought 20 large sized pizza for the party. The size is supposed to be 30 cm diameter. Their sizes were, however, varied as shown below.

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
$\boxed{2nd} \boxed{FIX} 4$	(FIX)	Specify 4 (decimal places)
28 $\boxed{\Sigma+} \boxed{\Sigma+}$	"n=" 2.0000	"28" x 2
29 $\boxed{2nd} \boxed{FRQ} 4 \boxed{\Sigma+}$	"n=" 6.0000	"29" x 4
30 $\boxed{2nd} \boxed{FRQ} 5 \boxed{\Sigma+}$	"n=" 11.0000	"30" x 5
31 $\boxed{2nd} \boxed{FRQ} 6 \boxed{\Sigma+}$	"n=" 17.0000	"31" x 6
32 $\boxed{2nd} \boxed{FRQ} 3 \boxed{\Sigma+}$	"n=" 20.0000	"32" x 3
$\boxed{2nd} \boxed{n} =$	20.0000	Total number of sample
$\boxed{2nd} \boxed{\bar{x}} =$	30.2000	Mean
$\boxed{2nd} \boxed{\Sigma x} =$	604.0000	Sum of the values
$\boxed{2nd} \boxed{\Sigma x^2} =$	18270.0000	Square sum of value
$\boxed{2nd} \boxed{\sigma_{X/N-1}} =$	1.2397	Standard deviation of sample
$\boxed{2nd} \boxed{\sigma_{X/N}} =$	1.2083	Standard deviation of population

Formula Calculation Functions

The formula functions get different formula results due to inputting different variable value. The built-in formula in this calculator has 38 common formulas. Press \boxed{FMILA} key to display the stored formula in sequence.

Built-in Formula:

1. Triangular area: $S = \frac{1}{2}bc \sin A$
2. Circular area: $S = \pi r^2$
3. Fan-shaped area: $S = \frac{1}{2}r^2\theta$
4. Parallelogramic area: $S = ab \sin \theta$
5. Elliptical area: $S = \pi ab$
6. Trapeziform area: $S = \frac{1}{2}(a+b)h$
7. Spherical surface area: $S = 4\pi r^2$
8. Cylindrical surface area: $S = 2\pi r(h+r)$
9. Spherical volume: $S = \frac{4}{3}\pi r^3$
10. Cylindrical volume: $V = \pi r^2 h$
11. Conical volume: $V = \frac{1}{3}\pi r^2 h$
12. Sum of arithmetic progression: $S = \frac{1}{2}n[2a_0 + (n-1)d]$
13. Sum of geometric progression: $S = \frac{a_0(r^n - 1)}{r - 1}$
14. Sum of square number: $S = \frac{1}{6}n(n+1)(2n+1)$
15. Sum of cubic number: $S = \frac{1}{2}n(n+1)^2$
16. Distance between arbitrary two points: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
17. Included angle of the intersecting lines: $\theta = \tan^{-1} \frac{k_2 - k_1}{1 + k_1 k_2}$
18. Law of cosines: $a = \sqrt{b^2 + c^2 - 2bc \cos A}$
19. Law of sines: $a = 2r \sin A$
20. Displacement of uniformly accelerated linear motion: $d = v_0 t + \frac{1}{2}at^2$
21. Velocity of uniformly accelerated linear motion: $v = v_0 + at$
22. Period of circular motion (1): $T = 2\pi r / v$
23. Period of circular motion (2): $T = 2\pi / \omega$
24. Period of simple pendulum: $T = 2\pi \sqrt{\frac{l}{g}}$
25. Electric oscillation frequency: $f = \frac{1}{2\pi\sqrt{LC}}$
26. Resistive formula: $R = \rho \cdot \frac{l}{S}$
27. Joule's theorem (1): $P = \frac{V^2}{R}$
28. Joule's theorem (2): $P = I^2 R$
29. Resistance of shunt resistance: $R = \frac{R1 * R2}{R1 + R2}$
30. Kinetic energy: $E = \frac{1}{2}mv^2$
31. Gravitational potential energy: $E = mgh$
32. Centrifugal force (1): $F = mv^2 / r$
33. Centrifugal force (2): $F = m\omega^2 r$
34. The law of gravity: $F = G \frac{Mm}{r^2}$
35. Electric field intensity: $E = Q / (4\pi\epsilon r^2)$
36. Heron's Formula (Triangular area): $S = \sqrt{\frac{a+b+c}{2}(\frac{a+b+c}{2}-a)(\frac{a+b+c}{2}-b)(\frac{a+b+c}{2}-c)}$
37. Refractive index: $E = \sin i / \sin r$
38. Critical angle of total reflection: $\theta = \sin^{-1}(n_2 / n_1)$

Operation	Display	Explanation
11 <input type="button" value="FMLA"/> <input type="button" value="="/> 5 <input type="button" value="="/> 8 <input type="button" value="="/>	$V = \frac{1}{3}\pi r^2 h$ <i>r</i> ? $V = \frac{1}{3}\pi r^2 h$ 209.4395102	Choose a built-in Formula. User can use <input type="button" value="FMLA"/> to choose Formula. Confirm to use the Formula $r=5, h=8$ $V=209.4395102$

General Calculation Examples

Addition and Subtraction

$8+3+5.5=16.5$	8 <input type="button" value="+"/> 3 <input type="button" value="+"/> 5.5 <input type="button" value="="/>	(16.5)
$-4+7-2=1$	<input type="button" value="(-)"/> 4 <input type="button" value="+"/> 7 <input type="button" value="-"/> 2 <input type="button" value="="/>	(1.)

Multiplication and Division

$3.6 \times 1.7=6.12$	3.6 <input type="button" value="×"/> 1.7 <input type="button" value="="/>	(6.12)
$592 \div 4.8$ $=123.3333333$	592 <input type="button" value="÷"/> 4.8 <input type="button" value="="/>	(123.3333333)

Mixed Calculations

$3+5 \times 7=38$	3 <input type="button" value="+"/> 5 <input type="button" value="×"/> 7 <input type="button" value="="/>	(38.)
$6 \times 9+3 \div 2=55.5$	6 <input type="button" value="×"/> 9 <input type="button" value="+"/> 3 <input type="button" value="÷"/> 2 <input type="button" value="="/>	(55.5)

Exponential Calculations

$(321 \times 10^{-14}) \times (65 \times 10^{28})$ $=2.0865 \times 10^{18}$	321 <input type="button" value="EE"/> <input type="button" value="(-)"/> 14 <input type="button" value="×"/> 65 <input type="button" value="EE"/> 28 <input type="button" value="="/>	(2.0865×10^{18})
--	--	---------------------------

Parentheses Calculations

$3+[(4-3.6+5) \times$ $0.8-6] \times 4.2$ $=-4.056$	3 <input type="button" value="+"/> <input type="button" value("(")"=""/> <input type="button" value("(")"=""/> 4 <input type="button" value="-"/> 3.6 <input type="button" value="+"> 5 <input type="button" value=")"/> <input type="button" value="×"/> .8 <input type="button" value="-"/> 6 <input type="button" value=")"/> <input type="button" value="×"/> 4.2 <input type="button" value="="/></input>	(-4.056)
---	---	----------

Percentage Calculations

$200 \times 17\%=34$	200 <input type="button" value="×"/> 17 <input type="button" value="2nd"/> <input type="button" value="%"/> <input type="button" value="="/>	(34.)
$\frac{456}{789} \times 100=$ 57.79467681%	456 <input type="button" value="÷"/> 789 <input type="button" value="2nd"/> <input type="button" value="%"/> <input type="button" value="="/>	(57.79467681)

Constants Calculation

$12 \times 8 = 96$	$\boxed{2\text{nd}} \boxed{K} \boxed{\times} 8 \boxed{=} \text{"k=*8"}$	
$2.4 \times 8 = 19.2$	$12 \boxed{=} \text{"12*8"}$	(96.)
$7 \times 8 = 56$	$2.4 \boxed{=} \text{"2.4*8"}$	(19.2)
	$7 \boxed{=} \text{"7*8"}$	(56.)
	$\boxed{2\text{nd}} \boxed{K} \text{ (Clear the constants)}$	

Fractional Calculation Examples

$\frac{2}{3} + 3\frac{4}{7} - \frac{5}{4} = 2\frac{83}{84}$	$2 \boxed{a^{bc}} 3 \boxed{+} 3 \boxed{a^{bc}} 4 \boxed{a^{bc}}$	
$(\frac{3}{5} + 2\frac{3}{8}) \times \frac{2}{5} \div 2 - 1 = -\frac{81}{200}$	$7 \boxed{-} 5 \boxed{a^{bc}} 4 \boxed{=} \text{(2_83_84)}$	
	$\boxed{(} 3 \boxed{a^{bc}} 5 \boxed{+} 2 \boxed{a^{bc}} 3$	
	$\boxed{a^{bc}} 8 \boxed{)} \boxed{\times} 2 \boxed{a^{bc}} 5$	
	$\boxed{\div} 2 \boxed{-} 1 \boxed{=} \text{(-81_200)}$	

Basic Function Calculation Examples

Pi Function $\boxed{\pi}$

10π	$10 \boxed{\pi} \boxed{=} \text{(31.41592654)}$
---------	---

Logarithmic Functions $\boxed{\text{LOG}}$ $\boxed{\text{LN}}$

$\log 123 = 2.089905111$	$\boxed{\text{LOG}} 123 \boxed{=} \text{(2.089905111)}$
$\ln 123 = 4.812184355$	$\boxed{\text{LN}} 123 \boxed{=} \text{(4.812184355)}$

Exponential Functions $\boxed{e^x}$ $\boxed{10^x}$

$e^{22} = 3584912846$	$\boxed{2\text{nd}} \boxed{e^x} 22 \boxed{=} \text{(3584912846.)}$
$10^{2.3} = 199.5262315$	$\boxed{2\text{nd}} \boxed{10^x} 2.3 \boxed{=} \text{(199.5262315)}$

Square Calculations $\boxed{x^2}$

$1.25^2 = 1.5625$	$1.25 \boxed{x^2} \boxed{=} \text{(1.5625)}$
-------------------	--

Power Calculations $\boxed{y^x}$

$5.43^3 = 160.103007$	$5.43 \boxed{y^x} 3 \boxed{=} \text{(160.103007)}$
$\frac{1}{5^4}$	$5 \boxed{y^x} 4 \boxed{x^1} \boxed{=} \text{(1.495348781)}$

Extraction of Square Root \sqrt{x}

$\sqrt{(5+6) \times 7} =$ 8.774964387	\sqrt{x} (5 + 6) \times 7) = (8.774964387)
--	--

Multiple Root $\sqrt[n]{x}$

$5.3\sqrt[5]{100}$ = 2.384286779	5.3 $\sqrt[n]{x}$ 100 = (2.384286779)
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Geometric Mean $\sqrt[n]{x}$

$\bar{G} =$ $\sqrt[4]{1.23 \times 1.48 \times 1.96 \times 2.2}$ = 1.673830182	4 $\sqrt[n]{x}$ (1.23 \times 1.48 \times 1.96 \times 2.2) = (1.673830182)
---	---

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

$\sqrt[3]{123} = 4.973189833$	$\sqrt[3]{x}$ 123 = (4.973189833)
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Reciprocal Calculations x^{-1}

$\frac{1}{2 \times 3 + 4} = 0.1$	(2 \times 3 + 4) x^{-1} = (0.1)
$\frac{1}{\frac{1}{3} - \frac{1}{4}} = 12$	(3 x^{-1} - 4 x^{-1}) x^{-1} = (12.)

Factorial Calculations $x!$

$(4 \times 2 - 3)! = 120$	(4 \times 2 - 3) $\sqrt[n]{x}$ = (120.)
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Hyperbolic Functions HYP

cosh34 = $2.917308713 \times 10^{14}$	HYP cos 34 = ($2.917308713 \times 10^{14}$)
tanh1.23 = 0.842579326	HYP tan 1.23 = (0.842579326)

Permutations (of n things taken r at a time) ${}^n P_r$

${}^n P_r = \frac{n!}{(n-r)!}$ ${}^5 P_3 = \frac{5!}{(5-3)!}$ $= 60$	5 2nd nPr 3 = (60.)
--	--

Combinations (of n things taken r at a time) ${}^n C_r$

${}^n C_r = \frac{n!}{r!(n-r)!}$ ${}^5 C_3 = \frac{5!}{3!(5-3)!}$ $= 10$	5 2nd nCr 3 = (10.)
--	--

Decimal Degrees ← Degrees-Minutes-Seconds DD>DMS DMS>DD

- Note:** i) Enter DMS (Degree / Minutes / Seconds values as D.MMSSs using 0s as necessary.
For example, enter 377'42" as 37.0742
- ii) Before using a DMS value in a calculation, you must convert it to decimal with 2nd DMS>DD.

$2.3456 \rightarrow 220'44''$ $12345'06'' \rightarrow 123.7516667$	2.3456 2nd DD>DMS (220'44"16) 123.4506 2nd DMS>DD (123.7516667)
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Angle Unit Mode Calculation Examples

Trigonometric Functions SIN COS TAN

$\text{Sin } 53 = 0.79863551$	DRG → "DEG" SIN 53 = (0.79863551)
$\text{Cos } \frac{\pi}{6}^{\text{RAD}} = 0.866025404$	DRG → "RAD" COS 6 x¹ π = (0.866025404)
$\text{Tan } 65^{\text{GRAD}} = 1.631851687$	DRG → "GRAD" TAN 65 = (1.631851687)

Trigonometric Calculations

SIN COS TAN

$\operatorname{cosec} x = \frac{1}{\sin x}$ $\operatorname{cosec} 45^\circ = 1.414213562$	DRG → "DEG" SIN 45 = x ⁻¹ = (1.414213562)
--	---

Inverse Trigonometric Functions

SIN⁻¹ COS⁻¹ TAN⁻¹

$\sin^{-1} 0.3 = 17.45760312^\circ$	(DEG) 2nd SIN ⁻¹ .3 = (17.45760312)
$\cos^{-1} 0.8 = 36.86989765^\circ$	(DEG) 2nd COS ⁻¹ .8 = (36.86989765)
$\tan^{-1} 1.5 = 56.30993247^\circ$	(DEG) 2nd TAN ⁻¹ 1.5 = (56.30993247)
$\sin^{-1} 1 = 1.570796327 \text{ (rad)}$	(RAD) 2nd SIN ⁻¹ 1 = (1.570796327)

Degree → Radian Conversion

DRG→

$60^\circ = 1.047197551^{\text{RAD}}$	DRG → "DEG" 60 2nd DRG→ (1.047197551)
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Radian → Gradient Conversion

DRG→

$2^{\text{RAD}} = 127.3239545^{\text{GRAD}}$	DRG → "RAD" 2 2nd DRG→ (127.3239545)
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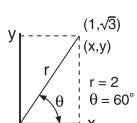
Gradient → Degree Conversion

DRG→

$120^{\text{GRAD}} = 108^\circ$	DRG → "GRAD" 120 2nd DRG→ (108.)
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Rectangular → Polar Conversion

R→P

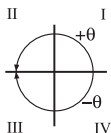
	DRG → "DEG" 1 2nd √ 3 2nd R→P "r=" (2.) → "θ=" (60.) ← "r=" (2.)
---	---

Polar → Rectangular

P→R

	DRG → "DEG" 2 [2nd] [] 60 [2nd] P→R []
	"x=" (1.)
	→ "y=" (1.732050808)
	← "x=" (1.)

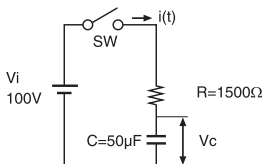
* In polar conversion θ in the third and fourth quadrant are as shown in the diagram below.



Applied Calculation Examples

Electricity - Integrating Circuit Problem

Obtain the voltage V_c across the capacitor at $t=56$ msec after the switch is turned on.



$V_c = V_i \left(1 - e^{-\frac{t}{RC}} \right)$														
$= 100 \times \left(1 - e^{-\frac{56 \times 10^{-3}}{1500 \times 50 \times 10^{-6}}} \right) = 52.60562649$														
100	[x]	[]	1	[-]	[2nd]	e^x	[(-)]	56	[x]	[2nd]	10^x	[(-)]	3	[]
[÷]	[]	1500	[x]	50	[x]	[2nd]	10^x	[(-)]	6	[]	[=]			
														(52.60562649)

Algebra

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

$$4x^2 + 9x + 2 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-9 \pm \sqrt{9^2 - 4 \times 4 \times 2}}{2 \times 4}$$

$$x = \begin{cases} -0.25 \\ -2 \end{cases}$$

9 x^2 - 4 \times 4 \times 2 STO 1 (M1) (49.)

(((-) 9 + \sqrt{x} RCL 1)) \div 2 \div 4 = (M1) (-0.25)

(((-) 9 - \sqrt{x} RCL 1)) \div 2 \div 4 = (M1) (-2.)

Input Range of Functions

Function	Input range
sin x cos x tan x	DEG: $ x < 1 \times 10^{10}$ RAD: $ x < 1 \times 10^{10}$ GRAD: $ x < 10/9 \times 10^{10}$ However, for tan x : DEG: $ x \neq 90(2n-1)$ RAD: $ x \neq \pi/2(2n-1)$ GRAD: $ x \neq 100(2n-1)$ (n is an integer)
$\sin^{-1} x$ $\cos^{-1} x$	$-1 \leq x \leq 1$
$\tan^{-1} x$	$ x < 1 \times 10^{100}$
ln x log x	$1 \times 10^{-99} \leq x \leq 1 \times 10^{100}$
e^x	$-1 \times 10^{100} < x \leq 230.2585092$
10^x	$-1 \times 10^{100} < x < 100$

Function	Input range
y^x	$y > 0 : -1 \times 10^{100} < x \log y < 100$ $y = 0 : 0 < x < 1 \times 10^{100}$ $y < 0 : -1 \times 10^{100} < x \log y < 100$ (x is an integer or 1/x is odd number)
${}^x\sqrt{y}$	$y > 0 : -1 \times 10^{100} < 1/x \log y < 100$ ($x \neq 0$) $y = 0 : 0 < x < 1 \times 10^{100}$ $y < 0 : -1 \times 10^{100} < 1/x \log y < 100$ (x is odd number or 1/x is an integer)
\sqrt{x}	$0 \leq x < 1 \times 10^{100}$
$\sqrt[3]{x}$	$ x < 1 \times 10^{100}$
x^2	$ x < 1 \times 10^{50}$
$x-1$	$ x < 1 \times 10^{100}$ ($x \neq 0$)
$n!$	$0 \leq n \leq 69$ (n is an integer)
nPr	$0 \leq r \leq n$ (r and n are integers), result $< 1 \times 10^{100}$
nCr	$0 \leq r \leq n$ (r and n are integers), result $< 1 \times 10^{100}$
$x, y \rightarrow r, \theta$	$ x < 1 \times 10^{100}, y < 1 \times 10^{100}$ $\sqrt{x^2 + y^2} < 1 \times 10^{100}, y/x < 1 \times 10^{100}$
$r, \theta \rightarrow x, y$	$0 \leq r < 1 \times 10^{100}$ DEG: $ \theta < 1 \times 10^{10}$, RAD: $ \theta < \pi/180 \times 10^{10}$, GRAD: $ \theta < 10/9 \times 10^{10}$
DRG \rightarrow	DEG \rightarrow RAD: $ x < 1 \times 10^{100}$ RAD \rightarrow GRAD: $ x < \pi/2 \times 10^{98}$ GRAD \rightarrow DEG: $ x < 1 \times 10^{100}$
Statistical calculations	$ x < 1 \times 10^{64}$ $ \sum x < 1 \times 10^{100}$ $n < 1 \times 10^{100}$ $\sum x^2 < 1 \times 10^{100}$ $x: n \neq 0$ $\sigma^n: 0 \leq \frac{\sum x^2 - ((\sum x)^2/n)}{n} < 1 \times 10^{100}, n > 0$ $\sigma^{n-1}: 0 \leq \frac{\sum x^2 - ((\sum x)^2/n)}{n-1} < 1 \times 10^{100}, n > 1$

Battery

Approx. 1,000 hours continuous display. When the display dims, change the battery.

- Keep the battery out of children's reach. If the battery is swallowed, contact a doctor immediately.
- Do not try to recharge, disassemble or do anything to the battery that could cause a short circuit.
- Do not expose the battery to high temperatures or open flames.
- Replace new battery to the same position.
- When the battery is replaced or malfunction occurs, push the reset switch at the rear with a pointed object.



Battery Replacement



How to Reset

- 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, use the tip of a ball point pen (or similar sharp object) to press the [RESET] button on the back of the calculator.



Advice and 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 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 a volatile liquid such as paint thinner. Instead, use only a soft, dry cloth.
- Do not under any circumstances dismantle this device. If you believe that the calculator is not functioning properly, either bring or mail the device together with the guarantee to the service representative of a Canon business office.

Specifications

Exponential Type Mantissa, 10 digits + exponent, 2 digits + sign, 2 digits

Floating Type Mantissa, 10 digits + sign, 1 digit

Calculation Range:

Decimal $1 \times 10^{-99} \sim 9.999999999 \times 10^{99}$

Auto Power Off Approx. **7 minutes**

Power Source: DC 3.0 V/0.065 mW

Lithium battery: Please refer to the product backside.

Approx. 1,000 hours continuous display.

Usable Temperature: 0 ~ 40C (32F ~ 104F)

Size: 152(L) x 77(W) x 13(H) mm (5-63/64" x 3-1/32" x 33/64")

Weight: 88g (3.1oz)

* Specifications are subject to change without notice.

For CA, USA Only

Included battery contains perchlorate material - special handling may apply.

See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/> for detail.