

SHARP

ENGLISH

SCIENTIFIC CALCULATOR

MODEL EL-520TG

OPERATION MANUAL

INTRODUCTION

Thank you for purchasing the SHARP Scientific Calculator Model EL-520TG. After reading this manual, store it in a convenient location for future reference.

Note:

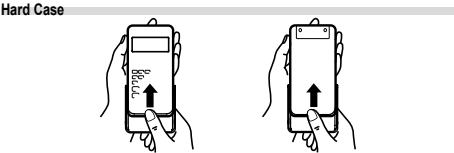
- On the sheet with calculation examples is used english notation (with a decimal point).
- This product uses a period as a decimal point.

- Operational Notes**
- Do not carry the calculator around in your back pocket, as it may break when you sit down. The display is made of glass and is particularly fragile.
 - Keep the calculator away from extreme heat such as on a car dashboard or near a heater, and avoid exposing it to excessively humid or dusty environments.
 - Since this product is not waterproof, do not use it or store it where fluids, for example water, can splash onto it. Raindrops, water spray, juice, coffee, steam, perspiration, etc. will also cause malfunction.
 - Clean with a soft, dry cloth. Do not use solvents or a wet cloth.
 - Do not drop it or apply excessive force.
 - Never dispose of batteries in a fire.
 - Keep batteries out of the reach of children.
 - For the sake of your health, try not to use this product for long periods of time. If you need to use the product for an extended period, be sure to allow your eyes, hands, arms, and body adequate rest periods (about 10–15 minutes every hour).
 - If you experience any pain or fatigue while using this product, discontinue use immediately. If the discomfort continues, please consult a doctor.
 - This product, including accessories, may change due to upgrading without prior notice.

NOTICE

- SHARP strongly recommends that separate permanent written records be kept of all important data. Data may be lost or altered in virtually any electronic memory product under certain circumstances. Therefore, SHARP assumes no responsibility for data lost or otherwise rendered unusable whether as a result of improper use, repairs, defects, battery replacement, use after the specified battery life has expired, or any other cause.
- SHARP will not be liable nor responsible for any incidental or consequential economic or property damage caused by misuse and/or malfunctions of this product and its peripherals, unless such liability is acknowledged by law.

- Press the RESET switch (on the back), with the tip of a ball-point pen or similar object, only in the following cases:
 - When using for the first time
 - After replacing the battery
 - To clear all memory contents
 - When an abnormal condition occurs and all keys are inoperative.
- Do not use an object with a breakable or sharp tip.** Note that pressing the RESET switch erases all data stored in memory.
- If service should be required on this calculator, use only a SHARP servicing dealer, SHARP approved service facility, or SHARP repair service where available.



- During actual use, not all symbols are displayed at the same time.
 - Certain inactive symbols may appear visible when viewed from a far off angle.
 - Only the symbols required for the usage currently being explained are shown in the display and calculation examples in this manual.
- ←/→:** Appears when the entire equation cannot be displayed.
- Press **◀**/**▶** to see the remaining (hidden) section.
- xy / rθ:** Indicates the mode of expression of results in the complex calculation mode.
- ▲ / ▼:** Indicates that data can be visible above/below the screen.
- Press **▲** / **▼** to scroll up/down the view.
- 2ndF:** Appears when **2ndF** is pressed, indicating that the functions shown in same color are enabled.
- HYP:** Indicates that **hYP** has been pressed and the hyperbolic functions are enabled. If **2ndF** **hYP** are pressed, the symbols **2ndF HYP** appear, indicating that inverse hyperbolic functions are enabled.
- ALPHA:** Indicates that **ALPHA**, **STO** or **RCL** has been pressed, and entry (recall) of memory contents and recall of statistics can be performed.
- FIX / SCI / ENG:** Indicates the notation used to display a value.
- DEG / RAD / GRAD:** Indicates angular units and changes each time **DRG** is pressed.
- STAT:** Appears when statistics mode is selected.
- M:** Indicates that a value is stored in the independent memory.
- ∠:** Appears when the calculator shows an angle as the result in the complex calculation mode.
- i:** Indicates an imaginary number is being displayed in the complex calculation mode.

BEFORE USING THE CALCULATOR

Key Notation Used in this Manual

e^x	To specify e^x	2ndF e^x
ln	To specify ln	ln
	To specify F	ALPHA F

- Functions that are printed in orange above the key require **2ndF** to be pressed first before the key. When you specify the memory, press **ALPHA** first. Numbers for input value are not shown as keys, but as ordinary numbers.

Power On and Off

Press **ON/C** to turn the calculator on, and **2ndF** **OFF** to turn it off.

Clearing the Entry and Memories

Operation	Entry (Display)	M	A – F, X, Y ANS	STAT ¹ STAT-VAR ²
ON/C	○	×	×	×
2ndF CA	○	×	○	○
Mode selection (MODE)	○	×	○	○
2ndF M-CL 0 0 ³	○	○	○	○
2ndF M-CL 1 0 ⁴	○	○	○	○
RESET switch	○	○	○	○

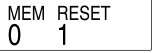
- : Clear ×: Retain
- ¹ Statistical data (entered data)
- ² \bar{X} , s_x , α_x , n , Σx , Σx^2 , \bar{y} , s_y , σ_y , Σy , Σy^2 , Σxy , r , a , b , c .
- ³ All variables are cleared. See 'About the Memory clear key' for details.
- ⁴ This key combination functions the same as the RESET switch.
- See 'About the Memory clear key' for details.

Memory clear key

Press **2ndF** **M-CL** to display the menu.

To clear all variables (M, A – F, X, Y, ANS, STAT VAR), press **0** **0** or **0** **ENT**.

To RESET the calculator, press **1** **0** or **1** **ENT**. The RESET operation will erase all data stored in memory, and restore the calculator's default setting.



- Entering and Correcting the Equation**
- Cursor keys**
- Press **◀** or **▶** to move the cursor. You can also return to the equation after getting an answer by pressing **▶** (**◀**). See the next section for using the **▲** and **▼** keys.
 - In the SET UP menu and other locations, use the **◀** or **▶** key to move the flashing cursor, then press **ENT** (**=**) key. If you need to scroll up/down the view, use the **▲** or **▼** key.

- Insert mode and Overwrite mode in the Equation display**
- Pressing **2ndF** **INS** switches between the two editing modes: insert mode (default); and overwrite mode. A triangular cursor indicates that an entry will be inserted at the cursor, while the rectangular cursor indicates to overwrite preexisting data as you make entries.
 - To insert a number in the insert mode, move the cursor to the place immediately after where you wish to insert, then make a desired entry. In the overwrite mode, data under the cursor will be overwritten by the number you enter.
 - The mode set will be retained until the next RESET operation.

- Deletion key**
- To delete a number/function, move the cursor to the number/function you wish to delete, then press **DEL**. If the cursor is located at the right end of an equation, the **DEL** key will function as a back space key.

- Multi-line Playback function**
- This calculator is equipped with a function to recall previous equations in the normal mode. Equations also include calculation ending instructions such as "=" and a maximum of 142 characters can be stored in memory. When the memory is full, stored equations are deleted in the order of the oldest first. Pressing **▲** will display the previous equation and the answer. Further pressing **▲** will display preceding equations (after returning to the previous equation, press **▼** to view equations in order). In addition, **2ndF** **▲** can be used to jump to the oldest equation.
- To edit an equation after recalling it, press **▶** (**◀**).
 - To edit the displayed equation, press **▶** (**◀**) immediately after obtaining a calculation answer.
 - The multi-line memory is cleared by the following operations: **2ndF** **CA**, **2ndF** **OFF** (including the Automatic Power Off feature), mode change, memory clear (**2ndF** **M-CL**), RESET, **2ndF** **RMW**, **ALPHA** **(RCL)** **ANS**, memory calculation, chain calculation, angle unit conversion, coordinate conversion, N-base conversion, numerical value storage to the temporary memories and independent memory, and input/deletion of statistical data.

- Priority Levels in Calculation**
- Operations are performed according to the following priority:
- Fractions (1/r4, etc.)
 - ∠, engineering prefixes
 - Functions preceded by their argument (x¹, x², n!, etc.)
 - y^x, x^y
 - Implied multiplication of a memory value (2Y, etc.)
 - Functions followed by their argument (sin, cos, etc.)
 - Implied multiplication of a function (2sin30, etc.)
 - nCR, nPr
 - ×, ÷, $\frac{\square}{\square}$, +, −
 - AND \square OR, XOR, XNOR
 - =, M+, M−, ⇒M, DEG, RAD, GRAD, DATA, CD, →rθ, →xy and other calculation ending instructions
- If parentheses are used, parenthesized calculations have precedence over any other calculations.

INITIAL SET UP

Mode Selection

Normal mode (NORMAL):	MODE 0 (default)
Used to perform arithmetic operations and function calculations.	
Statistics mode (STAT):	MODE 1
Used to perform statistical calculations.	
Complex number mode (COMPLEX):	MODE 2
Used for calculations with complex numbers.	

HOME Key

Press **HOME** to return to NORMAL mode from other modes.

Note: Equations and values currently being entered will disappear, in the same way as when the mode is changed.

- SET UP menu**
- Press **SET UP** to display the SET UP menu.
- Press **SET UP** to display the SET UP menu.
- FSE TAB
0
- A menu item can be selected by:
 - moving the flashing cursor by using **▶**/**◀**, then pressing **ENT** (**=**) key, or
 - pressing the number key corresponding to the menu item number.
 - If **▲** or **▼** is displayed on the screen, press **▲** or **▼** to view the previous/next menu screen.
 - Press **ON/C** to exit the SET UP menu.

- Selecting the Display Notation and Decimal Places**
- Four display notation systems are used to display calculation results: Floating point; Fixed decimal point; Scientific notation; and Engineering notation.
- When the FIX, SCI, or ENG symbol is displayed, the number of decimal places (TAB) can be set to any value between 0 and 9. Displayed values will be reduced to the corresponding number of digits.
- Setting the Floating Point Numbers System in Scientific Notation**
- Two settings are used to display a floating point number: NORM1 (default setting) and NORM2. A number is automatically displayed in scientific notation outside

a preset range:

- NORM1: $0.000000001 \leq x \leq 9999999999$
- NORM2: $0.01 \leq x \leq 9999999999$

Determination of the Angular Unit

In this calculator, the following three angular units (degrees, radians, and grads) can be specified.



- SCIENTIFIC CALCULATIONS**
- Press **MODE** **0** to select the normal mode.
 - In each example, press **ON/C** to clear the display. If the FIX, SCI, or ENG indicator is displayed, clear the indicator by selecting 'NORM1' from the SET UP menu.
- Arithmetic Operations**
- The closing parenthesis **)** just before **=** or **M+** may be omitted.
- Constant Calculations**
- In constant calculations, the addend becomes a constant. Subtraction and division are performed in the same manner. For multiplication, the multiplicand becomes a constant.
 - In the constants calculations, constants will be displayed as K.

- Functions**
- Refer to the calculation examples of each function.
 - Before starting calculations, specify the angular unit.

Random Function

The Random function has four settings for use in the normal or statistics mode. (This function cannot be selected while using the N-Base function.) Press **ON/C** to exit.

- The generated pseudo-random number series is stored in memory Y. Each random number is based on a number series.

Random Numbers

A pseudo-random number, with three significant digits from 0 up to 0.999, can be generated by pressing **2ndF** **RMW** **0** **ENT**.

Random Dice

To simulate a die-rolling, a random integer between 1 and 6 can be generated by pressing **2ndF** **RMW** **1** **ENT**.

Random Coin

To simulate a coin flip, 0 (head) or 1 (tail) can be randomly generated by pressing **2ndF** **RMW** **2** **ENT**.

Random Integer

An integer between 0 and 99 can be generated randomly by pressing **2ndF** **RMW** **3** **ENT**. To generate the next random integer number, press **ENT**.

Angular Unit Conversions

Each time **2ndF** **DRG** are pressed, the angular unit changes in sequence.

Memory Calculations

Mode	ANS	M	A – F, X, Y
NORMAL	○	○	○
STAT	○	×	×
CPLX	○	○	×

- : Available ×: Unavailable
- Temporary memories (A – F, X and Y)**
- Press **STO** and a variable key to store a value in memory.
- Press **RCL** and a variable key to recall a value from the memory.
- To place a variable in an equation, press **ALPHA** and a variable key.

Independent memory (M)

In addition to all the features of temporary memories, a value can be added to or subtracted from an existing memory value.

Press **ON/C** **STO** **M** to clear the independent memory (M).

- Last answer memory (ANS)**
- The calculation result obtained by pressing **=** or any other calculation ending instruction is automatically stored in the last answer memory.
- Note:
- Calculation results from the functions indicated below are automatically stored in memories X or Y replacing existing values.
 - Random function
 - rθ, →xy: X memory (r or x), Y memory (θ or y)
 - Use of **RCL** or **ALPHA** will recall the value stored in memory using up to 14 digits.

- Chain Calculations**
- The previous calculation result can be used in the subsequent calculation. However, it cannot be recalled after entering multiple instructions.
 - In the case of utilizing postfix functions ($\sqrt{\square}$, sin, etc.), you can perform a chain calculation even when the previous calculation result is cleared by the use of the **ON/C** key.

Fraction Calculations

Arithmetic operations and memory calculations can be performed using fractions, and conversion between a decimal number and a fraction.

- If the number of digits to be displayed is greater than 10, the number is converted to and displayed as a decimal number.

- Binary, Pental, Octal, Decimal, and Hexadecimal Operations (N-Base)**
- Conversions can be performed between N-base numbers. The four basic arithmetic operations, calculations with parentheses and memory calculations can also be performed, along with the logical operations AND, OR, NOT, NEG, XOR and XNOR on binary, pental, octal and hexadecimal numbers.
- Conversion to each system is performed by the following keys:
- | | |
|------------------------|---|
| 2ndF BIN | Converts to the binary system. "b" appears. |
| 2ndF PEN | Converts to the pental system. "p" appears. |
| 2ndF OCT | Converts to the octal system. "o" appears. |
| 2ndF HEX | Converts to the hexadecimal system. "h" appears. |
| 2ndF DEC | Converts to the decimal system. "d", "P", "o" and "h" disappear from the display. |

Conversion is performed on the displayed value when these keys are pressed.

Note: The hexadecimal numbers A – F are entered by pressing **ONST**, $\frac{\square}{\square}$, $\frac{\square}{\square}$, $\frac{\square}{\square}$, $\frac{\square}{\square}$.

$A \rightarrow \beta$, $B \rightarrow b$, $C \rightarrow \ell$, $D \rightarrow d$, $E \rightarrow \xi$, $F \rightarrow \mathcal{F}$

In the binary, pental, octal, and hexadecimal systems, fractional parts cannot be entered. When a decimal number having a fractional part is converted into a binary, pental, octal, or hexadecimal number, the fractional part will be truncated. Likewise, when the result of a binary, pental, octal, or hexadecimal calculation includes a fractional part, the fractional part will be truncated. In the binary, pental, octal, and hexadecimal systems, negative numbers are displayed as a complement

Conversion between decimal and sexagesimal numbers can be performed, and, while using sexagesimal numbers, conversion to seconds and minutes notation. The four basic arithmetic operations and memory calculations can be performed using the sexagesimal system.

$12^{\circ}34'56.78''$
degree minute second

Rectangular coord. \longleftrightarrow Polar coord.

- The calculation result is automatically stored in memories X and Y.
Value of r or x : X memory Value of θ or y : Y memory

A constant is recalled by pressing **2ndF** **CONST** followed by the number of the physical constant designated by a 2-digit number. The recalled constant appears in the display mode selected with the designated number of decimal places.

Physical constants can be recalled in the normal mode (when not set to binary, pental, octal, or hexadecimal), statistics mode and equation mode.

Note: Physical constants and metric conversions are based either on the 2014 CODATA recommended values or 2008 Edition of the "Guide for the Use of the International System of Units (SI)" released by NIST (National Institute of Standards and Technology) or on ISO specifications.

No.	Constant	No.	Constant
01	Speed of light in vacuum	28	Avogadro constant
02	Newtonian constant of gravitation	29	Molar volume of ideal gas (273.15 K, 101.325 kPa)
03	Standard acceleration of gravity	30	Molar gas constant
04	Electron mass	31	Faraday constant
05	Proton mass	32	Von Klitzing constant
06	Neutron mass	33	Electric charge to mass quotient
07	Muon mass	34	Quantum of circulation
08	Atomic mass unit-kilogram relationship	35	Proton gyromagnetic ratio
09	Elementary charge	36	Josephson constant
10	Planck constant	37	Electron volt
11	Boltzmann constant	38	Celsius Temperature
12	Magnetic constant	39	Astronomical unit
13	Electric constant	40	Parsec
14	Classical electron radius	41	Molar mass of carbon-12
15	Fine-structure constant	42	Planck constant over 2 pi
16	Bohr radius	43	Hartree energy
17	Rydberg constant	44	Conductance quantum
18	Magnetic flux quantum	45	Inverse fine-structure constant
19	Bohr magneton	46	Proton-electron mass ratio
20	Electron magnetic moment	47	Molar mass constant
21	Nuclear magneton	48	Neutron Compton wavelength
22	Proton magnetic moment	49	First radiation constant
23	Neutron magnetic moment	50	Second radiation constant
24	Muon magnetic moment	51	Characteristic impedance of vacuum
25	Compton wavelength	52	Standard atmosphere
26	Proton Compton wavelength		
27	Stefan-Boltzmann constant		

Unit conversions can be performed in the normal mode (when not set to binary, pental, octal, or hexadecimal), statistics mode and equation mode.

No.	Remarks	No.	Remarks
01	in : inch	23	fl oz (US) : fluid ounce(US)
02	cm : centimeter	24	mL : milliliter
03	ft : foot	25	fl oz (UK) : fluid ounce(UK)
04	m : meter	26	mL : milliliter
05	yd : yard	27	J : Joule
06	m : meter	28	cal : calorie
07	mile : mile	29	J : Joule
08	km : kilometer	30	cal ₁₅ : Calorie (15n°C)
09	n mile : nautical mile	31	J : Joule
10	m : meter	32	cal _{IT} : I.T. calorie
11	acre : acre	33	hp : horsepower
12	m ² : square meter	34	W : watt
13	oz : ounce	35	ps : French horsepower
14	g : gram	36	W : watt
15	lb : pound	37	(kgf/cm ²)
16	kg : kilogram	38	Pa : Pascal
17	°F : Degree Fahrenheit	39	atm : atmosphere
18	°C : Degree Celsius	40	Pa : Pascal
19	gal (US) : gallon (US)	41	(1 mmHg = 1 Torr)
20	L : liter	42	Pa : Pascal
21	gal (UK) : gallon (UK)	43	(kgf·m)
22	L : liter	44	N·m : Newtonmeter

Calculation can be executed in the normal mode (excluding Nbase) using the following 9 types of prefixes.

Prefix	Operation	Unit	Prefix	Operation	Unit
k (kilo)	MATH 1 0	10 ³	μ (micro)	MATH 1 5	10 ⁻⁶
M (Mega)	MATH 1 1	10 ⁶	n (nano)	MATH 1 6	10 ⁻⁹
G (Giga)	MATH 1 2	10 ⁹	p (pico)	MATH 1 7	10 ⁻¹²
T (Tera)	MATH 1 3	10 ¹²	f (femto)	MATH 1 8	10 ⁻¹⁵
m (milli)	MATH 1 4	10 ⁻³			

Calculation results are internally obtained in scientific notation with up to 14 digits for the mantissa. However, since calculation results are displayed in the form designated by the display notation and the number of decimal places indicated, the internal calculation result may differ from that shown in the display. By using the modify function, the internal value is converted to match that of the display, so that the displayed value can be used without change in subsequent operations.

Press **MODE** **1** to select the statistics mode. The seven statistical calculations listed below can be performed. After selecting the statistics mode, select the desired sub-mode by pressing the number key corresponding to your choice.

0	(SD)	: Single-variable statistics
1	(LINE)	: Linear regression calculation
2	(QUAD)	: Quadratic regression calculation
3	(EXP)	: Exponential regression calculation
4	(LOG)	: Logarithmic regression calculation
5	(PWR)	: Power regression calculation
6	(INV)	: Inverse regression calculation

Single-variable statistical calculation

Statistics of ① and value of the normal probability function

Statistics of ① and ② and, in addition, estimate of y for a given x (estimate y') and estimate of x for a given y (estimate x')

Statistics of ① and ②. In addition, estimate of y for a given x and estimate of x for a given y . (Since the calculator converts each formula into a linear regression formula before actual calculation takes place, it obtains all statistics, except coefficients a and b , from converted data rather than entered data.)

Statistics of ① and ② and coefficients a , b , c in the quadratic regression formula ($y = a + bx + cx^2$). (For quadratic regression calculations, no correlation coefficient (r) can be obtained.) When there are two x' values, press $2ndF \leftrightarrow$. When performing calculations using a , b and c , only one numeric value can be held.

①	\bar{x}	Mean of samples (x data)
	s_x	Sample standard deviation (x data)
	σ_x	Population standard deviation (x data)
	n	Number of samples
	Σx	Sum of samples (x data)
②	Σx^2	Sum of squares of samples (x data)
	\bar{y}	Means of samples (y data)
	s_y	Sample standard deviation (y data)
	σ_y	Population standard deviation (y data)
	Σy	Sum of samples (y data)
	Σy^2	Sum of squares of samples (y data)
	Σxy	Sum of products of samples (x, y)
	r	Correlation coefficient
	a	Coefficient of regression equation
	b	Coefficient of regression equation
	c	Coefficient of quadratic regression equation

- Use **(ALPHA)** and **(RCL)** to perform a STAT variable calculation.





Entered data are kept in memory until **2ndF** **CA** or mode selection. Before entering new data, clear the memory contents.

Single-variable data
 Data
 Data frequency (To enter multiples of the same data)

Two-variable data
 Data x Data y
 Data x Data y frequency (To enter multiples of the same data
 x and y.)

Correction prior to pressing **DATA** immediately after a data entry:
Delete incorrect data with **ON/C**, then enter the correct data.

Correction after pressing **DATA**:

Use   to display the data previously entered.
Press  to display data items in ascending (oldest first) order. To reverse the display order to descending (latest first), press the  key.
Each item is displayed with 'Xn=', 'Yn=' or 'N/n=' (n is the sequential number of the data set).

Display the data item to modify, input the correct value, then press **DATA**.
Using **(x,y)**, you can correct the values of the data set all at once.

- To delete a data set, display an item of the data set to delete, then press **[2ndF]** **[CD]**.
The data set will be deleted.
- To add a new data set, press **[ON/C]** and input the values, then press **[DATA]**.

Type	Regression formula
Linear	$y = a + bx$
Exponential	$y = a \cdot e^{bx}$
Logarithmic	$y = a + b \cdot \ln x$
Power	$y = a + x^b$
Inverse	$y = a + b \cdot \frac{1}{x}$
Quadratic	$y = a + bx + cx^2$

In the statistical calculation formulas, an error will occur when:

- The absolute value of the intermediate result or calculation result is equal to or greater than 1×10^{100} .
- The denominator is zero.
- An attempt is made to take the square root of a negative number.
- No solution exists in the quadratic regression calculation.

- $P(t)$, $Q(t)$ and $R(t)$ will always take positive values, even when $t < 0$, because these functions follow the same principle used when solving for an area.
- Values for $P(t)$, $Q(t)$ and $R(t)$ are given to six decimal places.

To carry out addition, subtraction, multiplication, and division using complex numbers, press **MODE** **2** to select the complex number mode.




Results of complex number calculations are expressed in two modes:

① **2ndF** **→xy**: Rectangular coordinate mode (*xy* appears)

② **2ndF** **→rθ**: Polar coordinate mode (*rθ* appears)

- ① Rectangular coordinates
 x -coordinate $\boxed{+}$ y -coordinate \boxed{i}
or x -coordinate $\boxed{+}$ y -coordinate
- ② Polar coordinates
 r $\boxed{<}$ θ
 r : absolute value θ : argument
- On selecting another mode, the imaginary part of any complex number stored in the independent memory (M) will be cleared.
- A complex number expressed in rectangular coordinates with the y -value equal to zero, or expressed in polar coordinates with the angle equal to zero, is treated as a real number.
- Press $\boxed{2ndF}$ \boxed{MATH} $\boxed{0}$ to return the complex conjugate of the specified complex number

Errors

An error will occur if an operation exceeds the calculation ranges, or if a mathematically illegal operation is attempted. When an error occurs, pressing  (or ) automatically moves the cursor back to the place in the equation where the error occurred. Edit the equation or press  to clear the equation.

Syntax error (Error 1):

- An attempt was made to perform an invalid operation.

Example: 2

- Calculation error (Error 2):
 - The absolute value of an intermediate or final calculation result equals or exceeds 10^{100} .
 - An attempt was made to divide by 0 (or an intermediate calculation resulted in zero).
 - The calculation ranges were exceeded while performing calculations.

- The available number of buffers was exceeded. (There are 10 buffers* for numeric values and 24 buffers for calculation instructions).
- *5 buffers in STAT mode and complex number mode.
- Data items exceeded 100 in the statistics mode.

Equation too long (Error 4):

- The equation exceeded its maximum input buffer (142 characters). An equation must be shorter than 142 characters.

- Within the ranges specified, this calculator is accurate to ± 1 of the least significant digit of the mantissa. However, a calculation error increases in continuous calculations due to accumulation of each calculation error. (This is the same for y^x , x^y , $n!$, e^x , \ln etc., where continuous calculations are performed internally.)

Additionally, a calculation error will accumulate and become larger in the vicinity of inflection points and singular points of functions.

- Calculation ranges:
 $\pm 10^{-99} \sim \pm 9.999999999 \times 10^{99}$ and 0.
 If the absolute value of an entry or a final or intermediate result of a calculation is less than 10^{-99} , the value is considered to be 0 in calculations and in the display.

Notes on Battery Replacement

Improper handling of batteries can cause electrolyte leakage or explosion. Be sure to observe the following handling rules:

- Make sure the new battery is the correct type.
- When installing, orient the battery properly as indicated in the calculator.
- The battery is factory-installed before shipment, and may be exhausted before it reaches the service life stated in the specifications.

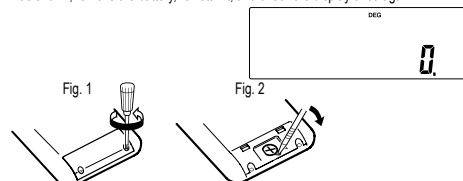
When the battery is replaced, the memory contents are erased. Erasure can also occur if the calculator is defective or when it is repaired. Make a note of all important memory contents in case accidental erasure occurs.

If the display has poor contrast or nothing appears on the display even when **ON/C** is pressed in dim lighting, it is time to replace the batteries.

- An exhausted battery left in the calculator may leak and damage the calculator.
- Fluid from a leaking battery accidentally entering an eye could result in serious injury.
- Should this occur, wash with clean water and immediately consult a doctor.
- Should fluid from a leaking battery come in contact with your skin or clothes, immediately wash with clean water.
- If the product is not to be used for some time, to avoid damage to the unit from leaking batteries, remove them and store in a safe place.
- Do not leave exhausted batteries inside the product.
- Keep batteries out of the reach of children.
- Explosion risk may be caused by incorrect handling.
- Do not throw batteries into a fire as they may explode.

1. Turn the power off by pressing  .
2. Remove the screws. (Fig. 1)
3. Lift the battery cover to remove.
4. Remove the used battery by prying it out with a ball-point pen or other similar pointed device. (Fig. 2)
5. Install one new battery. Make sure the "+" side is facing up.
6. Replace the cover and screws.
7. Press the RESET switch with the tip of a ball-point pen or similar object.

* Make sure that the display appears as shown below. If the display does not appear as shown, remove the battery, reinstall it, and check the display once again.




















This calculator will turn itself off to save battery power if no key is pressed for approximately 10 minutes.

Calculations:	Scientific calculations, statistical calculations, etc.
Internal calculations:	Matteisans of up to 14 digits
Pending operations:	24 calculations, 10 numeric values (5 numeric values in STAT mode)
Power source:	Built-in solar cells 1.5V \times (DC): Alkaline batterie (LR44 or equivalent) \times 1
Operating time:	Approx. 5,000 hours when continuously displaying 55555 at 25°C (77°F) (varies according to use and other factors)
Operating temperature:	0°C – 40°C (32°F – 104°F)
Dimensions:	80 mm \times 161 mm \times 15 mm
Weight:	Approx. 110 g (with batteries)
Accessories:	Battery \times 1 (installed), operation manual and hard case

<http://www.sharp-calculators.com>

【1】  

① $3(5+2)=$	 3  5  2  	21
② $3 \times 5 + 2 =$	3  5  2 	17
③ $3 \times 5 + 3 \times 2 =$	3  5  3  2 	21
→①	 	21
→②		17
→③		21
→②		17

100000÷3=					
[NORM1]	ON/C	100000	÷	3	=
→[FIX]	SET UP	0	0		33'333.33333
[TAB 2]	SET UP	1	2		33'333.3333
→[SCI]	SET UP	0	1		3.33 × 10⁰⁴
→[ENG]	SET UP	0	2		33.33 × 10⁰³
→[NORM1]	SET UP	0	3		33'333.33333
<hr/>					
3÷1000=					
[NORM1]	ON/C	3	÷	1000	=
→[NORM2]	SET UP	0	4		0.003
→[NORM1]	SET UP	0	3		3. × 10⁻⁰³
					0.003

45+285÷3= ON/C 45 + 285 ÷ 3 = **140.**

18+6= () 18 + 6) ÷
15-8= () 15 - 8 = **3.4285714285**

42×(-5)+120= 42 × (+/-) 5 + 120 = **-90.**
*1 (5 (+/-)) *1

$(5 \times 10^3) \div (4 \times 10^{-3}) = 5$ [Exp] 3 ÷ 4 [Exp]
(+/-) 3 = **1'250'000.**

$34+57=$	34	+	57	=	91
$45+57=$	45			=	102
$68 \times 25=$	68	\times	25	=	1'700
$68 \times 40=$			40	=	2'720

$\sin 60^\circ [=]$	$\text{ON/C} \quad (\sin) \quad 60 \quad [=]$	0.866025403
$\cos \frac{\pi}{4} [\text{rad}] =$	$\text{2ndF} \quad (\text{DRG}) \quad (\cos) \quad (\quad) \quad \left(\frac{\pi}{4} \right) \quad \div \quad 4 \quad) \quad [=]$	0.707106781
$\tan^{-1} [=] [g]$	$\text{2ndF} \quad (\text{DRG}) \quad \text{2ndF} \quad (\tan^{-1}) \quad 1 \quad [=]$ $\text{2ndF} \quad (\text{DRG})$	50.51081081
$(\cosh 1.5 + \sinh 1.5)^2 =$	$\text{ON/C} \quad (\quad) \quad (\text{hyp}) \quad (\cos) \quad 1.5 \quad (+) \quad (\text{hyp}) \quad (\sin) \quad 1.5 \quad) \quad X^2 \quad [=]$	20.08553692
$\tanh^{-1} \frac{5}{7} =$	$\text{2ndF} \quad (\text{archyp}) \quad (\tan) \quad (\quad) \quad 5 \quad \div \quad 7 \quad) \quad [=]$	0.895879734
$\ln 20 =$	$(\ln) \quad 20 \quad [=]$	2.995732274
$\log 50 =$	$(\log) \quad 50 \quad [=]$	1.698970004
$e^3 =$	$\text{2ndF} \quad (e^x) \quad 3 \quad [=]$	20.08553692
$10^{1.7} =$	$\text{2ndF} \quad (10^x) \quad 1.7 \quad [=]$	50.11872336
$\frac{1}{6} + \frac{1}{7} =$	$6 \quad \text{2ndF} \quad (X^{-1}) \quad + \quad 7 \quad \text{2ndF} \quad (X^{-1}) \quad [=]$	0.309523809
$8^{-2} - 3^4 \times 5^2 =$	$8 \quad (y^x) \quad (\div -) \quad 2 \quad - \quad 3 \quad (y^x) \quad (\times) \quad 5 \quad (X^2) \quad [=]$	-2'024.984375
$(12^3)^{\frac{1}{3}} =$	$12 \quad (y^x) \quad 3 \quad (y^x) \quad 4 \quad \text{2ndF} \quad (X^{-1}) \quad [=]$	6.447419591
$8^3 =$	$8 \quad (X^3) \quad [=]$	512.
$\sqrt[3]{49 - \sqrt[3]{81}} =$	$(\sqrt[3]{\quad}) \quad 49 \quad - \quad 4 \quad \text{2ndF} \quad (\sqrt[3]{\quad}) \quad 81 \quad [=]$	4.
$3\sqrt[3]{27} =$	$\text{2ndF} \quad (\sqrt[3]{\quad}) \quad 27 \quad [=]$	3.
$4! =$	$4 \quad \text{2ndF} \quad (n!) \quad [=]$	24.
$_{10}P_3 =$	$10 \quad \text{2ndF} \quad (nP_r) \quad 3 \quad [=]$	720.
${}_5C_2 =$	$5 \quad \text{2ndF} \quad (nC_r) \quad 2 \quad [=]$	10.
$500 \times 25\% =$	$500 \quad (\times) \quad 25 \quad \text{2ndF} \quad (\%) \quad [=]$	125.
$120 \div 400 = ?\%$	$120 \quad (\div) \quad 400 \quad \text{2ndF} \quad (\%) \quad [=]$	30.
$500 + (500 \times 25\%) =$	$500 \quad (+) \quad 25 \quad \text{2ndF} \quad (\%) \quad [=]$	625.
$400 - (400 \times 30\%) =$	$400 \quad (-) \quad 30 \quad \text{2ndF} \quad (\%) \quad [=]$	280.

90° → [rad]	<input type="text" value="ONIC"/> 90 <input type="text" value="2ndF"/> <input type="text" value="DRG"/>	1.570796327
→ [g]	<input type="text" value="2ndF"/> <input type="text" value="DRG"/>	1000
→ [°]	<input type="text" value="2ndF"/> <input type="text" value="DRG"/>	90
<hr/>		
sin ⁻¹ 0.8 = [°]	<input type="text" value="2ndF"/> <input type="text" value="sin⁻¹"/> 0.8 <input type="text" value="="/>	53.13010233
→ [rad]	<input type="text" value="2ndF"/> <input type="text" value="DRG"/>	0.927295211
→ [g]	<input type="text" value="2ndF"/> <input type="text" value="DRG"/>	59.03344706
→ [°]	<input type="text" value="2ndF"/> <input type="text" value="DRG"/>	53.13010233

$24 \div (8 \times 2) =$	$(ON/C) \ 8 \ (X) \ 2 \ (STO) \ (M)$	16
$(8 \times 2) \times 5 =$	$24 \ (\div) \ (ALPHA) \ (M) \ (=)$ $(ALPHA) \ (M) \ (X) \ 5 \ (=)$	1.0
$\$150 \times 3:M_1$	$(ON/C) \ (STO) \ (M)$	0
$\div \$250:M_2 = M_1 \div 250$	$150 \ (X) \ 3 \ (M+) =$	450
$-M_2 \div 5\%$	$250 \ (M+) =$	250
M	$(RCL) \ (M) \ (X) \ 5 \ (2ndF) \ (C) \ (%)$ $(2ndF) \ (M-) - (RCL) \ (M)$	35
$\$1 = ¥110$	$110 \ (STO) \ (Y)$	110
$¥26,510 = \$?$	$26510 \ (\div) \ (RCL) \ (Y) \ (=)$	241
$\$2,750 = ¥?$	$2750 \ (\div) \ (RCL) \ (Y) \ (=)$	302.500
$r = 3cm \ (r \rightarrow y)$	$3 \ (STO) \ (Y)$	3
$\pi r^2 = ?$	$(\pi) \ (ALPHA) \ (Y) \ (X^2) \ (=)$	28.27433388
$\frac{24}{4+6} = 2.4 \dots (A)$	$24 \ (\div) \ ((\ 4 \ (+ \ 6 \)) \ (=))$	2.4
$3 \times (A) + 60 \div (A) =$	$3 \ (X) \ (ALPHA) \ (ANS) \ (+) \ 60 \ (\div)$ $(ALPHA) \ (ANS)$	32.2

6+4=ANS	 6  4 	10
ANS+5	 5 	15
8×2=ANS	8  2 	16
ANS²	 	256
44+37=ANS	44  37 	81
√ANS=	 	9

$3\frac{1}{2} + \frac{4}{3} = [a\frac{b}{c}]$	<div>ON/C 3 a^b/c 1 a^b/c 2 $+$</div> <div>4 a^b/c 3 $=$</div>	4 7 5 6 4.833333333
$\rightarrow [a.xxx]$	<div>a^b/c</div> <div>2ndF d/c</div>	29 f
$10^{\frac{2}{3}} =$	<div>2ndF 10^x 2 a^b/c 3 $=$</div>	4.641588834
$(\frac{7}{5})^5 =$	<div>7 a^b/c 5 y^x 5 $=$</div>	16807 f 3125
$(\frac{1}{8})^{\frac{1}{3}} =$	<div>1 a^b/c 8 y^x 1 a^b/c 3</div> <div>$=$</div>	1 f
$\sqrt{\frac{64}{225}} =$	<div>$\sqrt{}$ 64 a^b/c 225 $=$</div>	8 f 15
$\frac{2^3}{3^4} =$	<div>$($ 2 y^x 3 $)$ a^b/c</div> <div>$($ 3 y^x 4 $)$ $=$</div>	8 f 81
$\frac{1.2}{2.3} =$	<div>1.2 a^b/c 2.3 $=$</div>	12 f 23
$\frac{1^{\circ}2'3''}{2} =$	<div>1 D/M/S 2 D/M/S 3 a^b/c 2 $=$</div>	0°31'7.5
$\frac{1 \times 10^3}{2 \times 10^3} =$	<div>1 (Exp) 3 a^b/c 2 (Exp) 3 $=$</div>	1 f
$A = 7$	<div>ON/C 7 STO A</div>	7
$\frac{4}{A} =$	<div>4 a^b/c ALPHA A $=$</div>	4 f
$1.25 + \frac{2}{5} = [a.xxx]$	<div>1.25 $+$ 2 a^b/c 5 $=$</div>	1.6
$\rightarrow [a\frac{b}{c}]$	<div>a^b/c</div>	1 f 13 f 20

$$* 4 \text{ r } 5 \text{ r } 6 = 4\frac{5}{6}$$

	$\theta = \sin^{-1} x, \theta = \tan^{-1} x$	$\theta = \cos^{-1} x$
DEG	$-90 \leq \theta \leq 90$	$0 \leq \theta \leq 180$
RAD	$-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$	$0 \leq \theta \leq \pi$
GRAD	$-100 \leq \theta \leq 100$	$0 \leq \theta \leq 200$

[10]	◀BIN	▶PEN	◀OCT	▶HEX	◀DEC	◀NEG	◀NOT	◀AND	◀OR
	XOR	XNOR							
DEC(25)→BIN	◀ON/C	◀2ndF	◀DEC	25	◀2ndF	▶BIN			11001 ^b
HEX(1AC)	◀2ndF	▶HEX	1AC						
→BIN	◀2ndF	▶BIN							110101100 ^b
→PEN	◀2ndF	▶PEN							3203 ^P
→OCT	◀2ndF	▶OCT							654 ^O
→DEC	◀2ndF	▶DEC							428
BIN(1010→100)	◀2ndF	▶BIN	()	1010	◀	100	()		
×11 =	◀X	11	=						10010 ^b
BIN(111)→NEG	◀NEG	111	=						1111111001 ^b
HEX(1FF)+	◀2ndF	▶HEX	1FF	◀2ndF	▶OCT	+			
OCT(512)=	512	=							1511 ^O
HEX(?)	◀2ndF	▶HEX							349 ^H
2FEC→	◀ON/C	STO	M	◀2ndF	▶HEX	2FEC	◀		
2C9E=(A)	2C9E	=	M+						34E ^H
+2000→	2000	◀							
1901=(B)	1901	=	M+						6FF ^H
(C)	◀RCL	M							A4d ^H
1011 AND	◀ON/C	◀2ndF	▶BIN	1011	◀AND				
101 = (BIN)	101	=							1 ^b
5A OR C3 = (HEX)	◀2ndF	▶HEX	5A	◀OR	C3	=			db ^H
NOT 10110 =	◀2ndF	▶BIN	NOT	10110	=				1111101001 ^b
(BIN)									
24 XOR 4 = (OCT)	◀2ndF	▶OCT	24	◀XOR	4	=			20 ^O
B3 XNOR	◀2ndF	▶HEX	B3	◀XNOR					
2D = (HEX)	2D	=							FFFFFFF61 ^H
→DEC	◀2ndF	▶DEC							-159

[11]	D\MS	↔DEG	MATH	(→sec, →min)					
12°39'18.05" →[10]	ON/C	12	D\MS	39	D\MS	18.05			
	2ndF	↔DEG							12.65501389
123.678→[60]		123.678	2ndF	↔DEG					123°40'40.8"
3h30m45s + 6h45m36s = [60]	3	D\MS	30	D\MS	45	+	6	D\MS	
	45	D\MS	36	=					10°16'21."
1234°56'12" + 0°0'34.567" = [60]	1234	D\MS	56	D\MS	12	+			
	0	D\MS	0	D\MS	34.567	=			1234°56'47."
3h45m - 1.69h = [60]	3	D\MS	45	-	1.69	=			
	2ndF	↔DEG							2°3'36."
sin62°12'24" = [10]	sin	62	D\MS	12	D\MS	24	=		
									0.884635235
24°→["]	24	D\MS	2ndF	MATH	1				86°400'
1500"→[']	0	D\MS	0	D\MS	1500	2ndF	MATH	2	25°

[12]	→Fθ	→xy	→	↔↔↔					
$\begin{cases} x=6 \\ y=4 \end{cases} \rightarrow \begin{cases} r= \\ \theta=[^\circ] \end{cases}$	ON/C	6	2ndF	→	4				
	2ndF	→Fθ	[r]						7.211102551
	2ndF	↔↔↔	[θ]						33.69006753
	2ndF	↔↔↔	[r]						7.211102551
$\begin{cases} r=14 \\ \theta=36[^\circ] \end{cases} \rightarrow \begin{cases} x= \\ y= \end{cases}$	14	2ndF	→	36					
	2ndF	→xy	[x]						11.32623792
	2ndF	↔↔↔	[y]						8.228993532
	2ndF	↔↔↔	[x]						11.32623792

[13]

CNST

V₀ = 15.3m/s

t = 10s

V₀t + $\frac{1}{2}gt^2$ = ?m

ON/C

15.3

X

10

+

2

2ndF

X⁻¹

X

CNST

03

X

10

X²

=

643.3325

[14] CONV									
<hr/>									
125yd = ?m	ON/C	125	2ndF	CONV	5	=			114.3

[15] MATH (k, M, G, T, m, μ, n, p, f)									
<hr/>									
100m×10k=	100	2ndF	MATH	0	4	×			
	10	2ndF	MATH	0	0	=			1'000.
<hr/>									

[16]	MDF	SETUP							
5÷9=ANS	ON/C	SET UP	0	0	SET UP	1	1		
ANS×9=	5	÷	9	=					0.6
[FIX,TAB=1]	X	9	=	×¹					5.0
	5	÷	9	=	2ndF	MDF			0.6
	X	9	=	×²					5.4
	SET UP	0	3						

*1 5.5555555555555×10⁻¹×9

*2 0.6×9

[17]	◀DATA	◀(t,y)	◀X̄	◀Sx	◀Ox	n	Σx	Σx²	ȳ
	◀SY	◀Oy	◀Σy	◀Σy²	◀Σx.y	r	a	b	c
	◀X'	◀y'	◀↔↔↔	MATH	(→x, P, Q, R)				

DATA	◀MODE	1	0						0.
95	95	◀DATA							1.
80	80	◀DATA							2.
80	80	◀DATA							3.
75	75	◀(t,y)	3	◀DATA					4.
75	75	◀DATA							5.
50									
\bar{x} =	◀RCL	◀X̄							75.71428571
σ _x =	◀RCL	◀Ox							12.37179148
n=	◀RCL	n							7.
Σ _x =	◀RCL	Σx							530.
Σ _x ² =	◀RCL	Σx²							41'200.
s _x =	◀RCL	◀Sx							13.3630621
s _x ² =	◀X²	=							178.5714286

$\frac{(95-\bar{x})}{s_x} \times 10 + 50 =$	()	95	◀	◀ALPHA	◀X̄	()			
	◀±	◀ALPHA	Sx	◀X	10				
	+	50	=						64.43210706

x = 60 → P(t) ?	◀2ndF	MATH	1	60					
	◀2ndF	MATH	()	=					0.102012
t = -0.5 → R(t) ?	◀2ndF	MATH	3	0.5					
	◀+/-	=							0.691463

$\begin{matrix} x & y \\ 2 & 5 \\ 2 & 5 \\ 12 & 24 \\ 21 & 40 \\ 21 & 40 \\ 21 & 40 \\ 15 & 25 \end{matrix}$	◀MODE	1	1						0.
	2	◀(t,y)	5	◀DATA					1.
	DATA								2.
	12	◀(t,y)	24	◀DATA					3.
	21	◀(t,y)	40	◀(t,y)	3	◀DATA			4.
	15	◀(t,y)	25	◀DATA					5.
	◀RCL	a							1.050261097
	◀RCL	b							1.826044386
	◀RCL	r							0.995176343
	◀RCL	Sx							8.541216597
	◀RCL	Sy							15.67223812

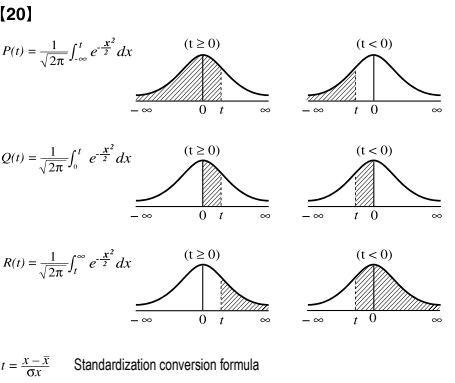
x=3 → y'=?	3	◀2ndF	◀y'						6.528394256
y=46 → x'=?	46	◀2ndF	◀x'						24.61590706

$\begin{matrix} x & y \\ 12 & 41 \\ 8 & 13 \\ 5 & 2 \\ 23 & 200 \\ 15 & 71 \end{matrix}$	◀MODE	1	2						0.
	12	◀(t,y)	41	◀DATA					1.
	8	◀(t,y)	13	◀DATA					2.
	5	◀(t,y)	2	◀DATA					3.
	23	◀(t,y)	200	◀DATA					4.
	15	◀(t,y)	71	◀DATA					5.
	◀RCL	a							5.357506761
	◀RCL	b							-3.120289663
	◀RCL	c							0.503334057

x=10 → y'=?	10	◀2ndF	◀y'						24.4880159
y=22 → x'=?	22	◀2ndF	◀x'						9.63201409
	◀2ndF	↔↔↔							-3.432772026
	◀2ndF	↔↔↔							9.63201409

[18]	DATA	▲	▼
DATA			
30	MODE	1	0
40	30	DATA	0.
40	40	(t,y) 2	DATA
50	50	DATA	1.
			2.
			3.
DATA			
30	▼	▼	▼
45	45	(t,y) 3	DATA
45	▼		
45			
60	▼ 60	DATA	
			X2= 45.
			N2= 3.
			X3= 60.

[19]	$\bar{x} = \frac{\sum x}{n}$	$\sigma_x = \sqrt{\frac{\sum x^2 - n\bar{x}^2}{n}}$
	$s_x = \sqrt{\frac{\sum x^2 - n\bar{x}^2}{n-1}}$	$\Sigma x = x_1 + x_2 + \dots + x_n$
		$\Sigma x^2 = x_1^2 + x_2^2 + \dots + x_n^2$
	$\bar{y} = \frac{\sum y}{n}$	$\sigma_y = \sqrt{\frac{\sum y^2 - n\bar{y}^2}{n}}$
		$\Sigma xy = x_1y_1 + x_2y_2 + \dots + x_ny_n$
		$\Sigma y = y_1 + y_2 + \dots + y_n$
		$\Sigma y^2 = y_1^2 + y_2^2 + \dots + y_n^2$
	$s_y = \sqrt{\frac{\sum y^2 - n\bar{y}^2}{n-1}}$	



\leftrightarrow DEG, D°M'S	$0^{\circ}0'.00001'' \leq x < 10000^{\circ}$
$x, y \rightarrow r, \theta$	$\sqrt{x^2 + y^2} < 10^{100}$
$r, \theta \rightarrow x, y$	$0 \leq r < 10^{100}$ DEG: $ \theta < 10^{10}$ RAD: $ \theta < \frac{\pi}{180} \times 10^{10}$ GRAD: $ \theta < \frac{10}{9} \times 10^{10}$
DRG ►	DEG→RAD, GRAD→DEG: $ x < 10^{100}$ RAD→GRAD: $ x < \frac{1}{2} \times 10^{98}$
(A+B)÷(C+D)	$ A + C < 10^{100}, B + D < 10^{100}$
(A+B)−(C+D)	$ A - C < 10^{100}, B - D < 10^{100}$
(A+B)×(C+D)	$(AC - BD) < 10^{100}$ $(AD + BC) < 10^{100}$
(A+B)÷(C+D)	$\frac{AC + BD}{C^2 + D^2} < 10^{100}$ $\frac{BC - AD}{C^2 + D^2} < 10^{100}$ $C^2 + D^2 \neq 0$
→DEC →BIN →PEN →OCT →HEX AND OR XOR XNOR	DEC : $ x \leq 9999999999$ BIN : $1000000000 \leq x \leq 1111111111$ $0 \leq x \leq 1111111111$ PEN : $2222222223 \leq x \leq 4444444444$ $0 \leq x \leq 2222222222$ OCT : $4000000000 \leq x \leq 7777777777$ $0 \leq x \leq 3777777777$ HEX : FDABF41C01 $\leq x \leq$ FFFFFFFF $0 \leq x \leq 2540BE3FF$
NOT	BIN : $1000000000 \leq x \leq 1111111111$ $0 \leq x \leq 1111111111$ PEN : $2222222223 \leq x \leq 4444444444$ $0 \leq x \leq 2222222221$ OCT : $4000000000 \leq x \leq 7777777777$ $0 \leq x \leq 3777777777$ HEX : FDABF41C01 $\leq x \leq$ FFFFFFFF $0 \leq x \leq 2540BE3FE$
NEG	BIN : $1000000001 \leq x \leq 1111111111$ $0 \leq x \leq 1111111111$ PEN : $2222222223 \leq x \leq 4444444444$ $0 \leq x \leq 2222222222$ OCT : $4000000001 \leq x \leq 7777777777$ $0 \leq x \leq 3777777777$ HEX : FDABF41C01 $\leq x \leq$ FFFFFFFF $0 \leq x \leq 2540BE3FF$

* n, m, r: integer


Physical constants and metric conversions are shown in the tables:

PHYSICAL CONSTANTS CNST 01 — 52

No. SYMBOL	UNIT	No. SYMBOL	UNIT	No. SYMBOL	UNIT
01 - c, c_0	m s ⁻¹	19 - μ_B	J T ⁻¹	37 - eV	J
02 - G	m ³ kg ⁻¹ s ⁻²	20 - μ_e	J T ⁻¹	38 - t	K
03 - g_n	m s ⁻²	21 - μ_N	J T ⁻¹	39 - AU	m
04 - m_e	kg	22 - μ_p	J T ⁻¹	40 - pc	m
05 - m_p	kg	23 - μ_n	J T ⁻¹	41 - $M(^{12}C)$	kg mol ⁻¹
06 - m_n	kg	24 - μ_μ	J T ⁻¹	42 - \hbar	J s
07 - m_μ	kg	25 - λ_c	m	43 - E_h	J
08 - Iu	kg	26 - $\lambda_{c,p}$	m	44 - G_0	s
09 - e	C	27 - σ	W m ⁻² K ⁻⁴	45 - α^{-1}	
10 - h	J s	28 - N_A, L	mol ⁻¹	46 - m_p/m_e	
11 - k	J K ⁻¹	29 - V_m	m ³ mol ⁻¹	47 - M_u	kg mol ⁻¹
12 - μ_0	N A ⁻²	30 - R	J mol ⁻¹ K ⁻¹	48 - $\lambda_{c,n}$	m
13 - \mathcal{E}_0	F m ⁻¹	31 - F	C mol ⁻¹	49 - c_j	W m ²
14 - r_e	m	32 - R_K	Ohm	50 - c_2	m K
15 - α		33 - e/m_e	C kg ⁻¹	51 - Z_0	Ω
16 - a_0	m	34 - $\hbar/2m_e$	m ² s ⁻¹	52 - atm	Pa
17 - R_∞	m ⁻¹	35 - γ_p	s ⁻¹ T ⁻¹		
18 - Φ_0	Wb	36 - K_J	Hz V ⁻¹		

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No. UNIT	No. UNIT	No. UNIT
1 in→cm	16 kg→lb	31 J→cal _{IT}
2 cm→in	17 °F→°C	32 cal _{IT} →J
3 ft→m	18 °C→°F	33 hp→W
4 m→ft	19 gal (US)→ℓ	34 W→hp
5 yd→m	20 ℓ→gal (US)	35 ps→W
6 m→yd	21 gal (UK)→ℓ	36 W→ps
7 mile→km	22 ℓ→gal (UK)	37 kgf/cm ² →Pa
8 km→mile	23 fl oz (US)→mℓ	38 Pa→kgf/cm ²
9 n mile→m	24 mℓ→fl oz (US)	39 atm→Pa
10 m→n mile	25 fl oz (UK)→mℓ	40 Pa→atm
11 acre→m ²	26 mℓ→fl oz (UK)	41 mmHg→Pa
12 m ² →acre	27 J→cal	42 Pa→mmHg
13 oz→g	28 cal→J	43 kgf·m→J
14 g→oz	29 J→cal ₁₅	44 J→kgf·m
15 lb→kg	30 cal ₁₅ →J	



ENGLISH

Information on the Disposal of this Equipment and its Batteries

1. In the European Union
Attention: If you want to dispose of this equipment, please do not use the ordinary dust bin!
Used electrical and electronic equipment must be treated separately and in accordance with legislation that requires proper treatment, recovery and recycling of used electrical and electronic equipment. Following the implementation by member states, private households within the EU states may return their used electrical and electronic equipment to designated collection facilities free of charge*. In some countries* your local retailer may also take back your old product free of charge if you purchase a similar new one.
*) Please contact your local authority for further details.
If your used electrical or electronic equipment has batteries or accumulators, please dispose of these separately beforehand according to local requirements.
By disposing of this product correctly you will help ensure that the waste undergoes the necessary treatment, recovery and recycling and thus prevent potential negative effects on the environment and human health which could otherwise arise due to inappropriate waste handling.

2. In other Countries outside the EU
If you wish to discard this product, please contact your local authorities and ask for the correct method of disposal.

Attention:
Your product is marked with this symbol. It means that used electrical and electronic products should not be mixed with general household waste. There is a separate collection system for these products.

Manufactured by:
SHARP CORPORATION
1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan

For EU only:

Imported into Europe by:
MORAVIA Consulting spol. s r.o.
Olomoucká 83, 627 00 Brno,
Czech Republic

For UK only:

Imported into UK by:
MORAVIA Europe Ltd.
Belmont House, Station Way, Crawley,
West Sussex RH10 1JA, Great Britain