

INTRODUCTION

Thank you for purchasing the SHARP Scientific Calculator Model EL-W531TL. 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

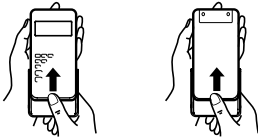
- SHARP strongly recommends that separate permanent written records be kept of all important data. Data may be lost or altered in virtually any electronic memory product under certain circumstances. Therefore, SHARP assumes no responsibility for data lost or otherwise rendered unusable whether as a result 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.

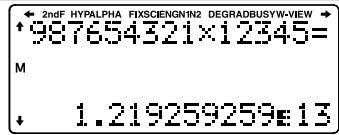
Do not use an object with a breakable or sharp tip. Note that pressing the RESET switch erases all data stored in memory.

If service should be required on this calculator, use only a SHARP servicing dealer, SHARP approved service facility, or SHARP repair service where available.

Hard Case



DISPLAY



Dot matrix display

- 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.

◀/▶/▲/▼: Indicates that some contents are hidden in the directions shown.

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 2ndF is 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 / N1 / N2: Indicates the notation used to display a value and changes by SET UP menu. N1 is displayed on-screen as "NORM1", and N2 as "NORM2".

DEG / RAD / GRAD: Indicates angular units and changes each time DRG is pressed.

BUSY: Appears during the execution of a calculation.

W-VIEW: Indicates that the WriteView editor is selected.

M: Indicates that a value is stored in the independent memory.

BEFORE USING THE CALCULATOR

Power On and Off

Press 2ndF to turn the calculator on. The data that was on-screen when the power was turned off will appear on the display.

Press 2ndF OFF to turn the calculator off.

Key Notation Used in this Manual

| | | | |
|-------|---|------------------|--------------|
| e^x | E | To specify e^x | : 2ndF e^x |
| In | | To specify ln | : In |
| | | To specify E | : ALPHA E |

- 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.

- Functions that are printed in gray adjacent to the keys are effective in specific modes.
- The multiplication operator "X" is differentiated from the letter "X" in this manual as follows:
 - To specify the multiplication operator: \times
 - To specify the letter "X": ALPHA X
- In certain calculation examples, where you see the LINE symbol, the key operations and calculation results are shown as they would appear in the Line editor.
- In each example, press 2ndF to clear the display first. Unless otherwise specified, calculation examples are performed in the WriteView editor (SET UP 2 0 0 0) with the default display settings.

Clearing the Entry and Memories

| Operation | Entry (Display) | A – F, M, X, Y | D1 – D3 | ANS | STAT ¹ |
|-------------------------------|-----------------|----------------|------------|------------|-------------------|
| ON/C | \bigcirc | x | x | x | x |
| 2ndF CA | \bigcirc | x | x | \bigcirc | \bigcirc |
| Mode selection (MODE) | \bigcirc | x | x | x | x ² |
| 2ndF M-CLB 0 | \bigcirc | x | x | x | x |
| 2ndF M-CLB 1 0 0 | \bigcirc | \bigcirc | \bigcirc | \bigcirc | \bigcirc |
| 2ndF M-CLB 2 0 0 ³ | \bigcirc | \bigcirc | \bigcirc | \bigcirc | \bigcirc |
| RESET switch ³ | \bigcirc | \bigcirc | \bigcirc | \bigcirc | \bigcirc |

- \bigcirc : Clear
- x: Retain
- ¹ Statistical data (entered data)
- ² Cleared when changing between sub-modes in STAT mode
- ³ The RESET operation will erase all data stored in memory and restore the calculator's default settings

Memory clear key

- Press 2ndF M-CLB to display the menu.
- To initialize the display settings, press 0. The parameters are set as follows:
 - Angular unit: DEG
 - Display notation: NORM1
 - N-base: DEC
 - Recurring decimal: OFF

Mode Selection

- NORMAL mode: (MODE 0) (default)
- Used to perform arithmetic operations and function calculations.
- STAT mode: (MODE 1)
- Used to perform statistical operations.
- TABLE mode: (MODE 2)
- Used to illustrate the changes in values of one or two functions in table format.
- DRILL mode: (MODE 3)
- Used to practice math and multiplication table drills.

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 (ON/C) to exit the SET UP menu.
- Note: You can press (BS) to return to the previously displayed parent menu.

- Determination of the angular unit (degrees, radians, and grades)
 - DEG (*): (SET UP 0 0 0) (default)
 - RAD (rad): (SET UP 0 1 1)
 - GRAD (g): (SET UP 0 2 2)

Selecting the display notation and decimal place

- Two settings of Floating point (NORM1 and NORM2), Fixed decimal point (FIX), Scientific notation (SCI), and Engineering notation (ENG).
- When (SET UP 1 0 0) (FIX) or (SET UP 1 2 2) (ENG) is pressed, the number of decimal places (TAB) can be set to any value between 0 and 9.
- When (SET UP 1 1 1) (SCI) is pressed, the number of significant digits can be set to any value between 0 and 9. Entering 0 will set a 10-digit display.

Setting the floating point number system in scientific notation

- NORM1 (the default) and NORM2. A number is automatically displayed in scientific notation outside a preset range:
 - NORM1 (SET UP 1 3 3): $0.000000001 \leq x \leq 9,999,999,999$
 - NORM2 (SET UP 1 4 4): $0.01 \leq x \leq 9,999,999,999$

Selecting the editor and setting the answer display

This calculator has the following two editors in NORMAL mode: WriteView and Line. Set the display format for numerical calculation results in WriteView editor.

The WriteView editor (W-VIEW)

- EXACT (a/b, $\sqrt{}$, π) (SET UP 2 0 0 0) (default)
- APPROX. (SET UP 2 0 0 1)

The Line editor (LINE)

- Notes:
 - When "EXACT (a/b, $\sqrt{}$, π)" is set, results will appear in fraction format or irrational number format (including π and $\sqrt{}$) when display is possible.
 - When "APPROX." is set, results will be decimal display or fraction display, and will be not shown in irrational number format (including π and $\sqrt{}$).
- Press 2ndF to change the calculation results to another format that can be displayed.

Adjusting the display contrast

Press (SET UP 3), then (+) or (–) to adjust the contrast. Press 2ndF to exit.

Insert and overwrite entry methods

When using the Line editor, you can change the entry method from "INSERT" (the default) to "OVERWRITE".

After you switch to the overwrite method (by pressing (SET UP 4 1 1)), the triangular cursor will change to a rectangular one, and the number or function underneath it will be overwritten as you make entries.

Setting the recurring decimal

- In NORMAL mode, calculation results can be shown in a recurring decimal format.
 - Recurring decimal is OFF: (SET UP 5 0 0) (default)
 - Recurring decimal is ON: (SET UP 5 1 1)
- In the WriteView editor, the recurring part is indicated by "–". In the Line editor, the recurring part is indicated in parentheses.
- If over 10 digits, including the recurring part, the result cannot be displayed in recurring decimal format.

Setting of the decimal point

- You can show the decimal point in the calculation result as either a dot or a comma.
 - DOT: (SET UP 6 0 0) (default)
 - COMMA: (SET UP 6 1 1)
- During entry, the decimal point is only shown as a dot.

ENTERING, DISPLAYING, AND EDITING THE EQUATION

The WriteView Editor

Entry and display

- In the WriteView editor, you can enter and display fractions or certain functions as you would write them.
- The WriteView editor can be used in NORMAL mode.

Displaying calculation results (when EXACT is selected)

- When possible, calculation results will be displayed using fractions, $\sqrt{}$ and π .
- When you press 2ndF, the display will cycle through the following display styles:
 - Mixed fractions (with or without π) → improper fractions (with or without π) → decimal numbers
 - Proper fractions (with or without π) → decimal numbers
 - Irrational numbers (square roots, fractions made using square roots) → decimal numbers
- Notes:
 - In the following cases, calculation results may be displayed using $\sqrt{}$:
 - Arithmetic operations and memory calculations
 - Trigonometric calculations
 - In trigonometric calculations, when entering values such as those in the table to the right, results may be shown using $\sqrt{}$.
 - DEG multiples of 15
 - RAD multiples of $\frac{1}{12}\pi$
 - GRAD multiples of $\frac{50}{3}$
 - Improper/proper fractions will be converted to and displayed as decimal numbers if the number of digits used in their expression is greater than nine.
 - In the case of mixed fractions, the maximum number of displayable digits (including integers) is eight.
 - If the number of digits in the denominator of a fractional result that uses π is greater than three, the result is converted to and displayed as a decimal number.

The Line Editor

Entry and display

- In the Line editor, you can enter and display equations line by line.
- Notes:
 - Up to three lines of text may be viewed on the screen at one time.
 - In the Line editor, calculation results are displayed in decimal form or line fraction notation if possible.
 - Use 2ndF to switch the display format to fractional form or decimal form (if possible).

Editing the Equation

Just after obtaining an answer, pressing (◀) brings you to the end of the equation and pressing (▶) brings you to the beginning. Press (◀), (▶), (▲) or (▼) to move the cursor. Press 2ndF (◀) or 2ndF (▶) to jump the cursor to the beginning or the end of the equation.

Back space and delete key

- To delete a number or function, move the cursor to the right of it, then press (BS).
- You can also delete a number or function that the cursor is directly over by pressing 2ndF DEL.
- Note: In a multi-level menu, you can press (BS) to back to the previous menu level.

Multi-line Playback Function

- This calculator is equipped with a function to recall previous equations and answers in NORMAL mode. Pressing (▲) will display the previous equation. The number of characters that can be saved is limited. When the memory is full, stored equations will be deleted to make room, starting with the oldest.
- To edit an equation after recalling it, press (◀) or (▶).
- The multi-line memory will be cleared by the following operations: 2ndF CA, mode change, RESET, N-base conversion, angular unit conversion, editor change (SET UP 2 0 0 0, SET UP 2 0 0 1 or SET UP 2 1 1), and memory clear (2ndF M-CLB 1 0 0).

Priority Levels in Calculation

- Operations are performed according to the following priority:
 - ① Fractions (1/r, etc.)
 - ② Functions preceded by their argument (x^{-1} , x^2 , n!, etc.)
 - ③ y^x , $\sqrt{}$
 - ④ Implied multiplication of a memory value (2Y, etc.)
 - ⑤ Functions followed by their argument (sin, cos, etc.)
 - ⑥ Implied multiplication of a function (2sin30, A!, etc.)
 - ⑦ nCr, nPr, GCD, LCM, \otimes , \div , int \div , \div , \div , \div AND ⑧ OR, XOR, XNOR
 - ⑨ =, M+, M–, \rightarrow M, \rightarrow DEG, \rightarrow RAD, \rightarrow GRAD, \rightarrow r/d, \rightarrow x/y and other calculation ending instructions
- If parentheses are used, parenthesized calculations have precedence over any other calculations.

SCIENTIFIC CALCULATIONS

- Press (MODE 0) to select NORMAL mode.

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.
- In the Line editor, the following symbols are used:
 - \wedge to indicate an expression's power ($\sqrt{}$, 2ndF e^x , 2ndF 10^x)
 - $\frac{\Box}{\Box}$ to separate integers, numerators, and denominators (a/b, 2ndF $\frac{a}{b}$)
- When using 2ndF (log₁₀) or 2ndF (abs) in the Line editor, values are entered in the following way:
 - logn (base, value)
 - abs value

Random Function

The random function has four settings. (This function cannot be selected while using the N-base function.) To generate further random numbers in succession, press 2ndF. Press 2ndF to exit.

Random numbers

A pseudo-random number, with three significant digits from 0 up to 0.999, can be generated by pressing 2ndF (RANDOM 0) 2ndF ENTER.

Note: In the WriteView editor, if the result is not 0 it can be shown as a fraction or decimal using 2ndF.

Random dice

To simulate a die-rolling, a random integer between 1 and 6 can be generated by pressing 2ndF (RANDOM 1) 2ndF ENTER.

Random coin

To simulate a coin flip, 0 (heads) or 1 (tails) can be randomly generated by pressing 2ndF (RANDOM 2) 2ndF ENTER.

Random integer

You can specify a range for the random integer with "R.Int()" only.

R.Int(minimum value, maximum value)

For example, if you enter 2ndF (RANDOM 3) 1 (1.5) 99 2ndF ENTER, a random integer from 1 to 99 will be generated.

Angular Unit Conversions 9

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

Memory Calculations 10

Memory calculations can be performed in NORMAL and STAT modes.

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 the value from that 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 (ONC) (STO) (M) to clear the independent memory (M).

Last answer memory (ANS)

The calculation result obtained by pressing (CE) or any other calculation ending instruction is automatically stored in the last answer memory.

Notes:

- Calculation results from the functions indicated below are automatically stored in the X or Y memories replacing any existing values.
 - $\rightarrow r\theta$, $\rightarrow xy$: X memory (r or x), Y memory (θ or y)
 - Two x' values from a quadratic regression calculation in STAT mode: X memory (1), Y memory (2)
- Use of (RCL) or (ALPHA) will recall the value stored in memory using up to 14 digits.

Definable memories (D1 – D3)

You can store functions or operations in definable memories (D1 – D3).

- To store a function or operation, press (STO), followed by a definable memory key (D1), (D2) or (D3), followed by the operation you want to store. Menu-related operations, such as (SETUP), cannot be stored. Press (ONC) to return to the previous display.
- To call a stored function or operation, press the corresponding memory key. Calling a stored function will not work if the function that is called would be unusable in the current context.
- Any functions or operations that are stored in a definable memory will be replaced when you save a new one into that memory.
- You cannot store functions or operations in definable memories when entering values or items in STAT mode.

Memory List

Press (ALPHA) (MEMORY) to display a list of the values saved in memory. The values are shown in a 9-character range.

Applicable memories: A, B, C, D, E, F, X, Y, M.

Chain Calculations 11

The previous calculation result can be used in the subsequent calculation. However, it cannot be recalled after entering multiple instructions.

Fraction Calculations 12

Arithmetic operations and memory calculations can be performed using fractions.

In NORMAL mode, conversion between a decimal number and a fraction can be performed by pressing (ONC).

Notes:

- Improper/proper fractions will be converted to and displayed as decimal numbers if the number of digits used in their expression is greater than nine. In the case of mixed fractions, the maximum number of displayable digits (including integers) is eight.
- To convert a sexagesimal value to a fraction, first convert it by pressing (2ndF) (MDEG).

Binary, Pental, Octal, Decimal, and Hexadecimal Operations (N-base) 13

Conversions can be performed between N-base numbers in NORMAL mode. 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.

Note: The hexadecimal numbers A – F are entered by pressing (X^A), (X^B), (X^C), (X^D), (X^E), (X^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.

Time, Decimal, and Sexagesimal Calculations 14

You can convert between decimal and sexagesimal numbers, and from sexagesimal numbers to seconds or minutes. In addition, the four basic arithmetic operations and memory calculations can be performed using the sexagesimal system.

Notation for sexagesimal is as follows:

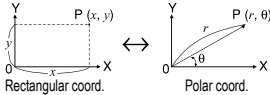
12° 34' 56.78"

degree minute second

Coordinate Conversions 15

Before performing a calculation, select the angular unit.

- The results of coordinate conversions will be displayed as decimal numbers even in the WriteView editor.



Modify Function 16

Decimal calculation results are internally obtained in scientific notation, with up to 14 digits in 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 ((2ndF) (MOD)) the internal value is converted to match that of the display, so that the displayed value can be used without change in subsequent operations.

- When using the WriteView editor, if the calculation result is displayed using fractions or irrational numbers, press (ONC) to convert it to decimal form first.

GCD (the Greatest Common Divisor)

What is the GCD of 24 and 36? (ONC) 24 (2ndF) (GCD) 36 = 12.

LCM (the Least Common Multiple)

What is the LCM of 15 and 9? (ONC) 15 (2ndF) (LCM) 9 = 45.

Calculating Quotient and Remainder 17

• "Q" indicates "Quotient", and "R" indicates "Remainder".

- Pressing (2ndF) (INT÷) cannot be followed by pressing a key for another operation such as +, -, ×, ÷, otherwise an error will result.
- The quotient and remainder are displayed in "NORM1" format. If not all digits can be displayed in "NORM1" format, normal division is performed.

Prime Factorization 18

In NORMAL mode, the calculation result can be shown as a product of prime numbers.

- A positive integer greater than 2 and no more than 10 digits can be factored into primes.
- A number that cannot be factored into a prime number with 3 digits or shorter is shown in parentheses.
- The calculation result of prime factorization is displayed according to the editor setting (W-VIEW or LINE).
- The calculation result of prime factorization may extend off the edges of the screen. You can see those parts by pressing (◀) or (▶). To jump to the left end or right end, press (2ndF) (◀) or (2ndF) (▶).

STATISTICAL CALCULATIONS 19 20

Statistical calculations can be performed in STAT mode.

There are eight sub-modes within STAT mode. Press (MODE) (1), then press the number key that corresponds to your choice:

- 0 (SD) : Single-variable statistics
- 1 (a+bx) : Linear regression
- 2 (a+bx+cx²) : Quadratic regression
- 3 (a·e^{b·bx}) : Euler exponential regression
- 4 (a+b·lnx) : Logarithmic regression
- 5 (a·x^b) : Power regression
- 6 (a+b/x) : Inverse regression
- 7 (a·b^x) : General exponential regression

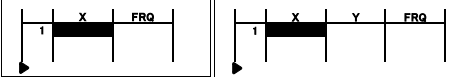
The statistical data input screen appears.

After entering statistical data from the input screen, press (DATA) or (ONC) and close the input table. You can then check statistical values from the STAT menu (ALPHA) (STAT) and specify statistical variables.

Data Entry and Correction

Data entry

Entry field



- After entering the data, press (ENTER). The input is finalized and the cursor moves to the next line. If data was not entered in an x or y, 0 is entered, 1 is entered in FRQ (frequency), and the cursor moves to the next line.
- You can use (CDS) to enter X and FRQ (or X, Y, and FRQ) at once
- In the input table, up to 6 digits are displayed for each value, including the sign and decimal point. Any values that exceed 6 digits in length are displayed in exponent notation.
- Up to 100 data items can be entered. With single-variable data, a data item with an assigned frequency of one is counted as one data item, while an item with an assigned frequency of 2 or higher is stored as a set of two data items. With two-variable data, a set of data items with an assigned frequency of one is counted as two data items, while a set of items with an assigned frequency of 2 or higher is stored as a set of three data items.
- To execute statistical calculation, press (DATA) or (ONC) and close the input table.

Data correction

Use (◀), (▶), (▲) or (▼) to move the cursor and select the desired data. Press (2ndF) (▲) or (2ndF) (▼) to jump the cursor to the beginning or end of the data.

Data correction

Move the cursor to the data that you want to correct, enter the numeric value, and press (ENTER).

Data insertion

To insert a line in front of the cursor position, press (ALPHA) (INS-D). The initial values entered in the inserted data are 0 in x and y, and 1 in FRQ.

Data deletion

To delete the entire line where cursor is positioned, press (2ndF) (DEL).

Notes:

- In STAT mode, all statistical data will be erased if the submode is changed or (2ndF) (CA) is pressed.
- In STAT mode, press (DATA) to display the input table.

Statistical Calculations and Variables

The following statistics can be obtained for each statistical calculation (refer to the table below):

Single-variable statistical calculation

Statistics of ① and ③.

Linear regression calculation

Statistics of ①, ② and ④. In addition, the estimate of y for a given x (estimate y') and the estimate of x for a given y (estimate x').

Quadratic regression calculation

Statistics of ①, ② and ④ and coefficients a, b, c in the quadratic regression formula (y = a + bx + cx²). (For quadratic regression calculations, no correlation coefficient (r) can be obtained.) When there are two x' values, each value will be displayed with "1." or "2.", and stored separately in the X and Y memories.

You can also specify the 1st value (x1') and the 2nd value (x2') separately.

Euler exponential regression, logarithmic regression, power regression, inverse regression, and general exponential regression calculations

Statistics of ①, ② and ④. In addition, the estimate of y for a given x and the 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.)

| | | |
|---|--------------|--|
| ① | n | Number of samples |
| | \bar{x} | Mean of samples (x data) |
| | sx | Sample standard deviation (x data) |
| | s²x | Sample variance (x data) |
| | σx | Population standard deviation (x data) |
| | $\sigma^2 x$ | Population variance (x data) |
| | Σx | Sum of samples (x data) |
| | Σx^2 | Sum of squares of samples (x data) |
| | xmin | Minimum value of samples (x data) |
| | xmax | Maximum value of samples (x data) |
| | | |
| | | |
| | | |
| | | |

| | | |
|---|----------------|--|
| ② | \bar{y} | Mean of samples (y data) |
| | sy | Sample standard deviation (y data) |
| | s²y | Sample variance (y data) |
| | σy | Population standard deviation (y data) |
| | $\sigma^2 y$ | Population variance (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) |
| | $\Sigma x^2 y$ | Sum of products of samples (x², y) |
| | Σx^3 | Sum of 3rd powers of samples (x data) |
| | Σx^4 | Sum of 4th powers of samples (x data) |
| | ymin | Minimum value of samples (y data) |
| | ymax | Maximum value of samples (y data) |
| | | |

| | | |
|---|----------------|-----------------------------------|
| ③ | Q ₁ | First quartile of sample (x data) |
| | Med | Median of sample (x data) |
| | Q ₃ | Third quartile of sample (x data) |

| | | |
|---|----|--|
| ④ | r | Correlation coefficient (Except Quadratic regression) |
| | a | Coefficient of regression equation |
| | b | Coefficient of regression equation |
| | c | Coefficient of quadratic regression equation |
| | R² | Coefficient of determination (Quadratic regression) |
| | r² | Coefficient of determination (Except Quadratic regression) |
| | | |

STAT Menu

After closing the input table, you can view statistical values, view regression coefficient values, and specify statistical variables from the STAT menu (ALPHA) (STAT).

(ALPHA) (STAT) (0): Display statistical values

(ALPHA) (STAT) (1): Display regression coefficient values

(ALPHA) (STAT) (2): Specify statistical value variables

(ALPHA) (STAT) (3): Specify statistical value (Σ related) variables

(ALPHA) (STAT) (4): Specify max/min value variables

(ALPHA) (STAT) (5): Specify regression coefficient variables

Notes:

- List display of regression coefficient values and specification of regression coefficient variables do not appear in single-variable statistical calculation.
- Estimated values x' and y' are specified with the keys (2ndF) (X'), (2ndF) (Y'). If there are two x' values, you can specify x'1 and x'2 from the STAT menu (ALPHA) (STAT) (5) to obtain the values separately.
- In the statistical value and regression coefficient value lists, you cannot return to the menu by pressing (BS).

Statistical Calculation Formulas 21

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 × 10¹⁰⁰.
- 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.

TABLE MODE 22

You can see the changes in values of one or two functions using TABLE mode.

Setting a table

1. Press (MODE) (2) to enter TABLE mode.
 2. Enter a function (Function1), and press (ENTER).
 3. If needed, enter the 2nd function (Function2) and press (ENTER).
 4. Enter a starting value (X, Start), and press (ENTER). The default starting value is 0.
 5. Enter a step value (X, Step). The default step value is 1.
 - You can use (▲) and (▼) to move the cursor between the starting value and step value.
 6. Press (ENTER) when you finish entering a step value. A table with a variable X and the corresponding values (ANS column) appears, displaying 3 lines below the starting value. If you entered two functions, the ANS1 and ANS2 columns appear. You can use (▲) and (▼) to change the X value and see its corresponding values in table format.
 - The table is for display only and you cannot edit the table.
 - The values are displayed up to 7 digits, including signs and a decimal point.
 - Press (◀) or (▶) to move the cursor to ANS column (ANS1 and ANS2 columns if you entered two functions) or X column.
 - Full digits of the value on the cursor are displayed on the bottom right.
- Notes:
- In a function, only "X" can be used as a variable, and other variables are all regarded as numbers (stored in the variables).
 - Irrational numbers such as √ and π can also be entered into a starting value or a step value. You cannot enter 0 or a negative number as a step value.
 - You can use WriteView editor when inputting a function.
 - The following features are not used in TABLE mode: coordinate conversions, conversion between decimal and sexagesimal numbers, and angular unit conversions.
 - It may take time to make a table, or "—" may be displayed, depending on the function entered or conditions specified for the variable X.
 - Please note that when making a table, the values for variable X are rewritten.
 - Press (2ndF) (CA) mode selection to return to the initial screen of the mode, and return to the default values for the starting value and step value.

DRILL MODE

Math Drill: (MODE) (3) (0)

Math operation questions with positive integers and 0 are displayed randomly. It is possible to select the number of questions and operator type.

Multiplication Table (× Table): (MODE) (3) (1)

Questions from each row of the multiplication table (1 to 12) are displayed serially or randomly.

To exit DRILL mode, press (MODE) and select another mode.

Using Math Drill and × Table

1. Press (MODE) (3) (0) for Math Drill or (MODE) (3) (1) for × Table.
2. **Math Drill:** Use (▲) and (▼) to select the number of questions (25, 50, or 100).
 - **× Table:** Use (▲) and (▼) to select a row in the multiplication table (1 to 12).
3. **Math Drill:** Use (◀) and (▶) to select the operator type for questions (+, -, ×, ÷ or + - × ÷).
 - **× Table:** Use (◀) and (▶) to select the order type ("Serial" or "Random").
4. Press (ENTER) to start.
 - When using Math Drill or × Table (random order only), questions are randomly selected and will not repeat except by chance.
5. Enter your answer. If you make a mistake, press (ONC) or (BS) to clear any entered numbers, and enter your answer again.

6. Press **ENTER**.
- If the answer is correct, "✓" appears and the next question is displayed.
 - If the answer is wrong, "✗" appears and the same question is displayed. This will be counted as an incorrect answer.
- If you press **ENTER** without entering an answer, the correct answer is displayed and then the next question is displayed. This will be counted as an incorrect answer.
7. Continue answering the series of questions by entering the answer and pressing **ENTER**.
8. After you finish, press **ENTER** and the number and percentage of correct answers are displayed.
9. Press **ENTER** to return to the initial screen for your current drill.

Ranges of Math Drill Questions

The range of questions for each operator type is as follows:

- +** **Addition operator:** "0 + 0" to "20 + 20"
- **Subtraction operator:** "0 - 0" to "20 - 20"; answers are positive integers and 0
- ×** **Multiplication operator:** "1 × 0" or "0 × 1" to "12 × 12"
- ÷** **Division operator:** "0 ÷ 1" to "144 ÷ 12"; answers are positive integers from 1 to 12 and 0, dividends of up to 144, and divisors of up to 12
- ÷** **Mixed operators:** Questions within all the above ranges are displayed

ERROR AND CALCULATION RANGES

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 **ON/C** to clear the equation.

Error Codes and Error Types

- ERROR 01: Syntax error**
- An attempt was made to perform an invalid operation.
Example: $2 \div 5$
- ERROR 02: Calculation error**
- The absolute value of an intermediate or final calculation result equals or exceeds 10^{100} .
 - An attempt was made to divide by zero (or an intermediate calculation resulted in zero).
 - The calculation ranges were exceeded while performing calculations.
 - 0 or a negative number was entered as a step value in TABLE mode. The absolute value of a starting value or a step value equals or exceeds 10^{100} in TABLE mode.
 - When the number to be factored into primes is greater than 2 and other than a 10-digit positive integer, or when the result of prime factorization is a negative number, decimal, fraction, $\sqrt{}$ or π .
- ERROR 03: Nesting error**
- The available number of buffers was exceeded. (There are 10 buffers for numeric values and 64 buffers for calculation instructions).
- ERROR 04: Data over error**
- Data items exceeded 100 in STAT mode.

Alert Messages

- Cannot delete!
- The selected item cannot be deleted by pressing **BS** or **2ndF DEL** in the WriteView editor.
Example: 5×3
In this example, delete the exponent before attempting to delete the parentheses.
- Cannot call!
- The function or operation stored in definable memory (D1 – D3) cannot be called. Ex. An attempt was made to recall a statistical variable from within NORMAL mode.
- Buffer full!
- The equation (including any calculation ending instructions) exceeded its maximum input buffer (159 characters in the WriteView editor or 161 characters in the Line editor). An equation may not exceed its maximum input buffer.

Calculation Ranges

- 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 π , $\sqrt{}$, $n!$, 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.
- Display of results using $\sqrt{}$ (when EXACT is selected)**
Calculation results may be displayed using $\sqrt{}$ when all of the following conditions are met:
 - When intermediate and final calculation results are displayed in the following form:
$$\pm \frac{a\sqrt{b}}{c} \pm \frac{d\sqrt{e}}{f}$$
 - When each coefficient falls into the following ranges:
 $1 \leq a < 100$; $1 < b < 1,000$; $0 \leq c < 100$;
 $1 \leq d < 1,000$; $1 \leq e < 100$; $1 \leq f < 100$
 - When the number of terms in the intermediate and final calculation results is one or two.Note: The result of two fractional terms that include $\sqrt{}$ will be reduced to a common denominator.

BATTERY REPLACEMENT

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.

Notes on erasure of memory contents

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.

When to Replace the Battery

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

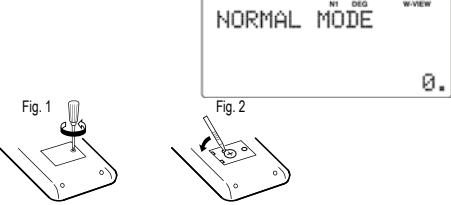
Cautions

- 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.

Replacement Procedure

1. Turn the power off by pressing **2ndF OFF**.
 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 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.
 8. Adjust the display contrast. See "Adjusting the display contrast". And then press **ON/C**.
- 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.



Automatic Power Off Function

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

SPECIFICATIONS

- Display: 96 × 32 dot matrix liquid crystal display
Display of calculation results:
Mantissa: 10 digits
Exponent: 2 digits
Internal calculations: Mantissas of up to 14 digits
Pending operations: 64 calculations 10 numeric values
Power source: 1.5V \approx (DC): Alkaline batterie (LR44 or equivalent) × 1
Operating time: Approx. 3,000 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 × 158 mm × 14 mm
Weight: Approx. 102 g (with batteries)
Accessories: Battery × 1 (installed), operation manual and hard case

FOR MORE INFORMATION ABOUT SHARP CALCULATORS VISIT:

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

CALCULATION EXAMPLES

1 SETUP (FSE)

| | | |
|----------------|--|---------------|
| 100000 ÷ 3 = | ON/C 100000 ÷ 3 = | 33'333.333333 |
| [NORM1] | SETUP 1 0 2 | 33'333.33 |
| → [FIX: TAB 2] | SETUP 1 1 2 | 3.3E04 |
| → [SCI: SIG 2] | SETUP 1 2 2 | 33.33E03 |
| → [ENG: TAB 2] | SETUP 1 3 | 33'333.333333 |

2 SETUP (EDITOR)

| | | |
|---|---|---------------|
| → [APPROX.] | ON/C SETUP 2 0 1 | 0. |
| 1 ÷ 2 = | 1 ÷ 2 = | 0.5 |
| → [EXACT(a/b, $\sqrt{}$, π)] | SETUP 2 0 0 | 0. |
| 1 ÷ 2 = | 1 ÷ 2 = | $\frac{1}{2}$ |

3 SETUP (RECURRING DECIMAL)

| | | |
|-------------|--|--------------------|
| → [ON] | ON/C SETUP 5 1 | 0. |
| 611 ÷ 495 = | 611 ÷ 495 = | $1\frac{116}{495}$ |
| | CHANGE | $\frac{611}{495}$ |
| | CHANGE | 1.234 |
| | CHANGE | 1.234343434 |
| | CHANGE | $1\frac{116}{495}$ |
| LINE | 611 ÷ 495 = | 1.2(34) |
| | CHANGE | 1.234343434 |
| | CHANGE | 1r116r495 |
| | CHANGE | 611r495 |
| | CHANGE | 1.2(34) |
| → [OFF] | ON/C SETUP 5 0 | 0. |

4 CHANGE

| | | |
|-------------------------------|---|----------------------|
| $\frac{2}{5} + \frac{3}{4} =$ | ON/C 2 a/b 5 ▶ + a/b 3 ▶ 4 = | $1\frac{3}{20}$ |
| | CHANGE | $\frac{23}{20}$ |
| | CHANGE | 1.15 |
| | CHANGE | $1\frac{3}{20}$ |
| $\sqrt{3} \times \sqrt{5} =$ | √ 3 ▶ × √ 5 = | $\sqrt{15}$ |
| | CHANGE | 3.87298346 |
| sin 45 = | sin 45 = | $\frac{\sqrt{2}}{2}$ |
| | CHANGE | 0.707106781 |

5 ▲ ▼

| | | |
|-----------------|---|-----|
| | 2ndF CA | 0. |
| ① 3(5 + 2) = | 3 (5 + 2) = | 21. |
| ② 3 × 5 + 2 = | 3 × 5 + 2 = | 17. |
| ③ (5 + 3) × 2 = | (5 + 3) × 2 = | 16. |
| → ① | 2ndF ▲ | 21. |
| → ② | ▼ | 17. |
| → ① | ▲ | 21. |
| → ③ | 2ndF ▼ | 16. |

| | |
|--|--|
| 6 | [+] [-] [X] [÷] [()] [(-)] [Exp] |
| 45 + 285 ÷ 3 = | [ON/C] 4 5 [+] 2 8 5 [÷] 3 [=] 140. |
| 18 + 6 = 15 - 8 = | [(] 1 8 [+] 6 [)] [÷] [(] 1 5 [-] 8 [=] 3 ³ / ₇ |
| 42 × -5 + 120 = | 4 2 [X] [(-)] 5 [+] 1 2 0 [=] -90. |
| (5 × 10 ³) ÷ (4 × 10 ⁻³) = | 5 [Exp] 3 [÷] 4 [Exp] [(-)] 3 [=] 1'250'000. |

7

| | | |
|------------------|--------------------------------------|--------|
| $34 + 57 =$ | $34 \text{ [+] } 57 \text{ [=]}$ | 91. |
| $45 + 57 =$ | 45 [=] | 102. |
| $68 \times 25 =$ | $68 \text{ [X] } 25 \text{ [=]}$ | 1'700. |
| $68 \times 40 =$ | 40 [=] | 2'720. |

| | |
|---|---|
| 8 | [sin] [cos] [tan] [sin⁻¹] [cos⁻¹] [tan⁻¹] [π] [hyp] [arc hyp] [ln] [log] [log₁₀X] [e^x] [e^y] [10^x] [X⁻¹] [X²] [X³] [y^x] [√] [³√] [ⁿ√] [n!] [nPr] [nCr] [%] [abs] |
| sin 60 [°] = | [ON/C] [SETUP] [0] [0] [0] [sin] 6 0 [=] ^{√3} / ₂ [engage] 0.866025403 |
| cos ^π / ₄ [rad] = | [SETUP] [0] [1] [cos] [π] [ab] 4 [=] ^{√2} / ₂ [engage] 0.707106781 |
| tan ⁻¹ 1 [g] = | [SETUP] [0] [2] [2ndF] [tan⁻¹] 1 [=] 50. [SETUP] [0] [0] |
| (cosh 1.5 + sinh 1.5) ² = | [ON/C] [(] [hyp] [cos] 1 5 [+] [hyp] [sin] 1 5 [)] [X²] [=] 20.08553692 |
| tanh ⁻¹ ⁵ / ₇ = | [2ndF] [arc hyp] [tan] [(] 5 [÷] 7 [)] [=] 0.895879734 |
| ln 20 = | [ln] 2 0 [=] 2.995732274 |
| log 50 = | [log] 5 0 [=] 1.698970004 |
| log ₂ 16384 = | [2ndF] [log₁₀X] 2 [▶] 1 6 3 8 4 [=] 14. [LINE] [2ndF] [log₁₀X] 2 [(] [^(x,y)] 1 6 3 8 4 [)] [=] 14. |
| e ³ = | [2ndF] [e^x] 3 [=] 20.08553692 |
| 1 ÷ e = | 1 [÷] [ALPHA] [e^y] [=] 0.367879441 |
| 10 ^{1.7} = | [2ndF] [10^x] 1 7 [=] 50.11872336 |
| ¹ / ₆ + ¹ / ₇ = | 6 [2ndF] [X⁻¹] [+] 7 [2ndF] [X⁻¹] [=] ¹³ / ₄₂ [engage] 0.309523809 |

| | |
|---|---|
| 8 ⁻² - 3 ⁴ × 5 ² = | 8 [y^x] [(-)] 2 [▶] [-] 3 [y^x] 4 [▶] [X] 5 [X²] [=] -2024 ⁶³ / ₆₄ [engage] -129599 ⁶⁴ / ₆₄ [engage] -2'024,984375 |
|---|---|

| | |
|---------------|--|
| [LINE] | 8 [y^x] [(-)] 2 [=] 3 [y^x] 4 [X] 5 [X²] [=] -2'024,984375 [engage] -2024r63r64 [engage] -129599r64 |
|---------------|--|

| | |
|--------------------------|---|
| 8 ³ = | 8 [2ndF] [X³] [=] 512. |
| √49 - ⁴ √81 = | [√] 4 9 [▶] [-] 4 [2ndF] [³√] 8 1 [=] 4. [LINE] [³√] 4 9 [-] 4 [2ndF] [³√] 8 1 [=] 4. |
| ³ √27 = | [2ndF] [³√] 2 7 [=] 3. |

| | |
|-------------------------------|---|
| 4! = | 4 [2ndF] [n!] [=] 24. |
| 10P ₃ = | 1 0 [2ndF] [nPr] 3 [=] 720. |
| ⁵ C ₂ = | 5 [2ndF] [nCr] 2 [=] 10. |
| 500 × 25% = | 5 0 0 [X] 2 5 [2ndF] [%] 125. |
| 120 ÷ 400 = % | 1 2 0 [÷] 4 0 0 [2ndF] [%] 30. |
| 500 + (500 × 25%) = | 5 0 0 [+] 2 5 [2ndF] [%] 625. |
| 400 - (400 × 30%) = | 4 0 0 [-] 3 0 [2ndF] [%] 280. |
| 5 - 9 = | [2ndF] [abs] 5 [-] 9 [=] 4. |

| | | |
|------|---|-------------------------|
| | θ = sin ⁻¹ x, θ = tan ⁻¹ x | θ = cos ⁻¹ x |
| DEG | -90 ≤ θ ≤ 90 | 0 ≤ θ ≤ 180 |
| RAD | - ^π / ₂ ≤ θ ≤ ^π / ₂ | 0 ≤ θ ≤ π |
| GRAD | -100 ≤ θ ≤ 100 | 0 ≤ θ ≤ 200 |

| | |
|-------------|---|
| 9 | [DRG▶] |
| 90° → [rad] | [ON/C] 9 0 [2ndF] [DRG▶] ¹ / ₂ π |
| → [g] | [2ndF] [DRG▶] 100. |
| → [°] | [2ndF] [DRG▶] 90. |

| | |
|--|---|
| 10 | [ALPHA] [RCL] [STO] [M+] [M-] [ANS] [D1] [D2] [D3] |
| 8 × 2 ⇒ M | [ON/C] 8 [X] 2 [STO] [M] 16. |
| 24 ÷ (8 × 2) = | 2 4 [÷] [ALPHA] [M] [=] 1 ¹ / ₂ |
| (8 × 2) × 5 = | [ALPHA] [M] [X] 5 [=] 80. |
| 0 ⇒ M | [ON/C] [STO] [M] 0. |
| \$150 × 3 ⇒ M ₁ | 1 5 0 [X] 3 [M+] 450. |
| +) \$250: M ₁ + 250 ⇒ M ₂ | 2 5 0 [M+] 250. |
| -) M ₂ × 5% | [RCL] [M] [X] 5 [2ndF] [%] 35. |
| M = | [RCL] [M] 665. |
| $\frac{24}{4+6} = 2\frac{2}{5} \dots (A)$ | 2 4 [÷] [(] 4 [+] 6 [)] [=] 2 ² / ₅ |
| 3 × (A) + 60 ÷ (A) = | 3 [X] [ALPHA] [ANS] [+] 6 0 [÷] [ALPHA] [ANS] [=] 32 ¹ / ₅ |
| sinh ⁻¹ ⇒ D1 | [STO] [D1] [2ndF] [arc hyp] [sin] |
| sinh ⁻¹ 0.5 = | [D1] 0 5 [=] 0.481211825 |

| | | |
|--------------------|---|------|
| 11 | | |
| 6 + 4 = ANS | [ON/C] 6 [+] 4 [=] | 10. |
| ANS + 5 = | [+] 5 [=] | 15. |
| 8 × 2 = ANS | 8 [×] 2 [=] | 16. |
| ANS ² = | [x²] [=] | 256. |

| | |
|---|---|
| 12 | [a/b] [ab/c] |
| 3 ¹ / ₂ + ⁴ / ₃ = | [ON/C] 3 [2ndF] [ab/c] 1 [▼] 2 [▶] [+] [a/b] 4 [▼] 3 [=] 4 ⁵ / ₆ [engage] ²⁹ / ₆ [engage] 4.833333333 |
| [LINE] | 3 [a/b] 1 [a/b] 2 [+] 4 [a/b] 3 [=] 4r5r6* [engage] 29r6 [engage] 4.833333333 |

| |
|---|
| * 4r5r6 = 4 ⁵ / ₆ |
|---|

| | |
|----------------------|--|
| 13 | [◀BIN] [▶PEN] [◀OCT] [▶HEX] [▶DEC] [NEG] [NOT] [AND] [OR] [XOR] [XNOR] |
| DEC (25) → BIN | [ON/C] [2ndF] [▶DEC] 2 5 [2ndF] [▶BIN] BIN 11001 |
| HEX (1AC) | [2ndF] [▶HEX] 1 A C |
| → BIN | [2ndF] [▶BIN] BIN 110101100 |
| → PEN | [2ndF] [▶PEN] PEN 3203 |
| → OCT | [2ndF] [▶OCT] OCT 654 |
| → DEC | [2ndF] [▶DEC] 428. |
| BIN (111) → NEG | [2ndF] [▶BIN] 1 1 1 [=] BIN 1111111001 |
| 1011 AND 101 = [BIN] | [2ndF] [▶BIN] 1 0 1 1 [AND] 1 0 1 [=] BIN 1 |
| 5A OR C3 = [HEX] | [2ndF] [▶HEX] 5 A [OR] C 3 [=] HEX DB |
| NOT 10110 = [BIN] | [2ndF] [▶BIN] [NOT] 1 0 1 1 0 [=] BIN 1111101001 |
| 24 XOR 4 = [OCT] | [2ndF] [▶OCT] 2 4 [XOR] 4 [=] OCT 20 |
| B3 XNOR 2D = [HEX] | [2ndF] [▶HEX] B 3 [XNOR] 2 D [=] HEX FFFFFFFF61 |
| → DEC | [2ndF] [▶DEC] -159. |

| | |
|-------------------------------------|---|
| 14 | [D/M/S] [↔DEG] |
| 7°31'49.44" → [10] | [ON/C] 7 [D/M/S] 3 1 [D/M/S] 4 9 4 [2ndF] [↔DEG] 7 ⁶⁶³ / ₁₂₅₀ |
| 123.678 → [60] | 1 2 3 6 7 8 [2ndF] [↔DEG] 123°40'40.8" |
| 3h 30m 45s + 6h 45m 36s = [60] | 3 [D/M/S] 3 0 [D/M/S] 4 5 [+] 6 [D/M/S] 4 5 [D/M/S] 3 6 [=] 10°16'21." |
| 1234°56'12" + 0°0'34.567" = [60] | 1 2 3 4 [D/M/S] 5 6 [D/M/S] 1 2 [+] 0 [D/M/S] 0 [D/M/S] 3 4 5 6 7 [=] 1234°56'47." |
| 3h 45m - 1.69h = [60] | 3 [D/M/S] 4 5 [-] 1 6 9 [=] [2ndF] [↔DEG] 2°3'36." |
| sin 62°12'24" = [10] | [sin] 6 2 [D/M/S] 1 2 [D/M/S] 2 4 [=] 0.884635235 |

| | |
|---|--|
| 15 | [↔rθ] [↔xy] [(x,y)] |
| $\begin{cases} x = 6 \\ y = 4 \end{cases} \rightarrow \begin{cases} r = \\ \theta = [^\circ] \end{cases}$ | [ON/C] 6 [(x,y)] 4 [↔rθ] [↔rθ] r: 7.211102551 [2ndF] [↔rθ] 0 [↔rθ] θ: 33.69006753 |
| $\begin{cases} r = 14 \\ \theta = 36 [^\circ] \end{cases} \rightarrow \begin{cases} x = \\ y = \end{cases}$ | 1 4 [(x,y)] 3 6 [↔xy] [↔xy] X: 11.32623792 [2ndF] [↔xy] Y: 8.228993532 |

| | |
|------------------|---|
| 16 | [MDF] |
| → [FIX, TAB = 1] | [ON/C] [SETUP] [1] [0] 1 0.0 |
| 5 ÷ 9 = ANS | 5 [÷] 9 [=] ⁵ / ₉ [engage] 0.6 |
| ANS × 9 = | [X] 9 [=] *1 5.0 [engage] ⁵ / ₉ [engage] 0.6 |
| → [MDF] | [2ndF] [MDF] ³ / ₅ |
| ANS × 9 = | [X] 9 [=] *2 5 ² / ₅ [engage] [engage] 5.4 |
| → [NORM1] | [SETUP] [1] [3] 5.4 |

| |
|---|
| +1 ⁵ / ₉ × 9 = 5.5555555555555 × 10 ⁻¹ × 9 |
| +2 ³ / ₅ × 9 = 0.6 × 9 |

| | |
|--------------|---|
| 17 | [int÷] |
| 23 ÷ 5 = | [ON/C] 2 3 [2ndF] [int÷] 5 [=] Q: 4. R: 3. |
| 9.5 ÷ 4 = | 9 5 [2ndF] [int÷] 4 [=] Q: 2. R: 1.5 |
| -32 ÷ (-5) = | [(-)] 3 2 [2ndF] [int÷] [(-)] 5 [=] Q: 6. R: -2. |

| | |
|-----------|--|
| 18 | [PFACT] |
| 12210 = | [ON/C] 1 2 2 1 0 [=] 12'210. |
| | [2ndF] [PFACT] 2×3×5×11×37 |
| | [2ndF] [PFACT] 12'210. |
| 1234567 = | 1 2 3 4 5 6 7 [=] 1'234'567. |
| | [2ndF] [PFACT] 127×(9721) |

[illegible]

DATA

| x | y |
|----|-----|
| 12 | 41 |
| 8 | 13 |
| 5 | 2 |
| 23 | 200 |
| 15 | 71 |

Frequency Table

| X | Y | FREQ |
|---|----|------|
| 4 | 23 | 1 |
| 5 | 15 | 1 |
| 6 | | |

Calculator Screenshots:

1. **MODE** → **2** → **12** (x,y) → **41** (x,y) → **8** (x,y) → **13** (x,y) → **2** (x,y) → **23** (x,y) → **200** (x,y) → **15** (x,y) → **71** (x,y) → **ENTER**

2. **DATA** → **Stat** → **2** → **[a+bx+cx²]** → **0**

3. **ALPHA** → **[STAT]** → **1**

4. **a + bx + cx²**
 $a = 5.357506761$
 $b = -3.120289663$
 \downarrow **c = 0.503334057**

5. **▼** → **↑** **a + bx + cx²**
 $R^2 = 0.99994806$

6. $x = 10 \rightarrow y' = ?$ → **ON/C** → **10** → **2ndF** → y' → **10** → y' → **24.4880159**

7. $y = 92 \rightarrow x' = ?$ → **22** → **2ndF** → x' → **12** → x' → **9.63201409**
 $2:$ → **-3.432772026**

8. **22** → **ALPHA** → **[STAT]** → **5** → **5** → $22 \cdot x^2$ → **-3.432772026**

21

$$\bar{x} = \frac{\Sigma x}{n}$$

$$sx = \sqrt{\frac{\Sigma x^2 - n\bar{x}^2}{n-1}}$$

$$\bar{y} = \frac{\Sigma y}{n}$$

$$sy = \sqrt{\frac{\Sigma y^2 - n\bar{y}^2}{n-1}}$$

$$\sigma x = \sqrt{\frac{\Sigma x^2 - n\bar{x}^2}{n}}$$

$$\sigma y = \sqrt{\frac{\Sigma y^2 - n\bar{y}^2}{n}}$$

22 MODE (TABLE) **TABLE**

$x^2 + 1$

MODE 2 ALPHA
 x' x^2 +
 1 ENTER ENTER

X_Start: 2
 X_Step: 1

1 ENTER

▼ ▼ ▼
 ▼

| X | ANS |
|----|-----|
| -2 | 5 |
| -1 | 2 |
| 0 | 1 |

↑

↓ -2

$x^2 + 1$

MODE 2 ALPHA
 x' x^2 +
 1 ENTER ENTER

X_Start: 2
 X_Step: 1

1 ENTER

▼ ▼ ▼
 ▼

| X | ANS |
|---|-----|
| 0 | 1 |
| 1 | 2 |
| 2 | 5 |

↑

↓ 2

| Function | Dynamic range |
|-----------------------------|--|
| $\sin x, \cos x, \tan x$ | DEG: $ x < 10^{10}$ $(\tan x: x \neq 90(2n-1))^*$ RAD: $ x < \frac{\pi}{180} \times 10^{10}$ $(\tan x: x \neq \frac{\pi}{2}(2n-1))^*$ GRAD: $ x < \frac{10}{9} \times 10^{10}$ $(\tan x: x \neq 100(2n-1))^*$ |
| $\sin^{-1}x, \cos^{-1}x$ | $ x \leq 1$ |
| $\tan^{-1}x, \sqrt[3]{x}$ | $ x < 10^{100}$ |
| $\ln x, \log x, \log_a x$ | $10^{-99} \leq x < 10^{100}, 10^{-99} \leq a < 10^{100} (a \neq 1)$ |
| y^x | <ul style="list-style-type: none"> $y > 0$: $-10^{100} < x \log y < 100$ $y = 0$: $0 < x < 10^{100}$ $y < 0$: $x = n$ $(0 < x < 1: \frac{1}{x} = 2n-1, x \neq 0)^*$ $-10^{100} < x \log y < 100$ |
| $x\sqrt[y]{y}$ | <ul style="list-style-type: none"> $y > 0$: $-10^{100} < \frac{1}{x} \log y < 100 (x \neq 0)$ $y = 0$: $0 < x < 10^{100}$ $y < 0$: $x = 2n-1$ $(0 < x < 1: \frac{1}{x} = n, x \neq 0)^*$ $-10^{100} < \frac{1}{x} \log y < 100$ |
| e^x | $-10^{100} < x \leq 230.2585092$ |
| 10^x | $-10^{100} < x < 100$ |
| $\sinh x, \cosh x, \tanh x$ | $ x \leq 230.2585092$ |

| | |
|--|--|
| $\sinh^{-1}x$ | $ x < 10^{50}$ |
| $\cosh^{-1}x$ | $1 \leq x < 10^{50}$ |
| $\tanh^{-1}x$ | $ x < 1$ |
| x^2 | $ x < 10^{50}$ |
| x^3 | $ x < 2.15443469 \times 10^{33}$ |
| \sqrt{x} | $0 \leq x < 10^{100}$ |
| x^{-1} | $ x < 10^{100} (x \neq 0)$ |
| $n!$ | $0 \leq n \leq 69^*$ |
| nPr | $0 \leq r \leq n \leq 9999999999^*$ $\frac{n!}{(n-r)!} < 10^{100}$ |
| nCr | $0 \leq r \leq n \leq 9999999999^*$ $0 \leq r \leq 69$ $\frac{n!}{r!(n-r)!} < 10^{100}$ |
| $\leftrightarrow \text{DEG, D}^\circ\text{M'S}$ | $0^\circ 0' 0.00001'' \leq x < 10000^\circ$ |
| $x, y \rightarrow r, \theta$ | $\sqrt{x^2 + y^2} < 10^{100}$ |
| $r, \theta \rightarrow x, y$ | $0 \leq r < 10^{100}$ DEG: $ \theta < 10^{10}$ RAD: $ \theta < \frac{\pi}{180} \times 10^{10}$ GRAD: $ \theta < \frac{10}{9} \times 10^{10}$ |
| DRG► | DEG \rightarrow RAD, GRAD \rightarrow DEG: $ x < 10^{100}$ RAD \rightarrow GRAD: $ x < \frac{\pi}{2} \times 10^{98}$ |
| $n\text{GCD}_n, n\text{LCM}_n$ | $0 < n < 10^{10}^*$ |
| R.Int(m, n) | $ m \leq 9999999999^*$ $ n \leq 9999999999^*$ $m < n, n - m < 10^{10}$ |
| $\rightarrow \text{DEC}$ $\rightarrow \text{BIN}$ $\rightarrow \text{PEN}$ $\rightarrow \text{HEX}$ 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: $\text{FDABF41C01} \leq x \leq \text{FFFFFFFFFFFF}$ $0 \leq x \leq 2540\text{BE3FF}$ |
| NOT | 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: $\text{FDABF41C01} \leq x \leq \text{FFFFFFFFFFFF}$ $0 \leq x \leq 2540\text{BE3FE}$ |
| 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: $\text{FDABF41C01} \leq x \leq \text{FFFFFFFFFFFF}$ $0 \leq x \leq 2540\text{BE3FF}$ |

* n, m, r: integer



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.

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