ativa	Before Starting Calculations Operation Modes When using this calculator, it is necessary to select the proper mode to meet your requirements. This can be done by pressing [MODE] to scroll through sub-menus. Then	If after making corrections, input of the formula is complete, the answer can be obtained by pressing $[=]$. If, however, more is to be added to the formula, advance the cursor using the $[ightarrow]$ key to the end of the formula for input.	Example Operation Display (Lower) The stored 10-digit result (28.571421857) is used when you continue [×] Ans × (upper display)	I To clear memory contents, press [0] [STO] [M]. Image: Addition/subtraction to or from sum in memory cannot Image: Book state s
AT-30i	Press [MODE] once to read the first page of the main menu.	If an unnecessary character has been included in a formula, use the $[\cdot]$ and $[\cdot]$ keys to move to the position of the error and press the "DEL" key. Each press of "DEL" will delete one command (one step). Example: To correct an input of $369 \times \times 2$ to 369×2 :- $369[\times][\times]2$	the calculation by simply pressing [X] or any other arithmetic function key. 14 [=] 400.000 (The final result is automatically rounded to the specified three	 Difference between [STO][M] and [M+], [SHIFT][M-]:- Both [STO] [M] and [M+], [SHIFT] [M-] can be used to input results into memory, however when the [STO] [M] operation is used, previous memory contents are cleared. When either [M+] or [SHIFT] [M-] is used, value is added or subtracted to or from present sum in memory.
	Press [MODE] again. Deg Rad Gra 1 2 3 Press [MODE] further.	[4][4][DEL] = 0.	decimal places.) Cancel specification by [MODE][MODE][MODE][3][1] specifying "Norm" again.	Example: Input 456 into memory "M" using [STO] [M] procedure. Memory already contains value of 123. [ON/AC] [1] [2] [3] [STO] [M] M= M 123.
2-lines display Scientific Calculator	Fix Sci Norm 1 2 3 Press "MODE" once more to leave the menu.	If a character has been omitted from a formula, use the [4] and [•] key to move to the position where the character should have been input, and press [SHIFT] followed by [INS] key. Each press of [SHIFT] [INS] will create a space for input of one command. Example: To correct an input of 2.36 ² to sin 2.36 ² :-	As the number of decimal places is specified, the intermediate result will be automatically rounded to the specified decimal places. However, the stored intermediate result is not rounded. In order to match the displayed value and the stored value, [SHIFT] [Rnd] can be input.	$\begin{bmatrix} ON/AC \\ [4] \\ [5] \\ [6] \\ [5] \\ [6] \\ $
with advance statistical functions	Calculation Modes "COMP" mode : - general calculations, including function calculations can be executed. "SD" mode:- standard deviation calculation can be executed. "SD" symbol appears in display. "REG" mode:- regression calculations can be performed. "REG" symbol appears in display.	$2[*]36[x^2] \qquad \qquad \boxed{2 \cdot 36^2} \qquad \qquad \boxed{0}.$ [4][4][4][4][4][4] \qquad \qquad \boxed{2 \cdot 36^2} \qquad \qquad \boxed{0}. [SHIFT][INS]	You can compare the final result obtained in the previous example with the final result of the following example. Example Operation Display (Lower) 200 ÷ 7 × 14 = 400 rounded to 3 decimal 200[+17 [×] 14[=] [MODE][MODE][MODE][1][3] 400. 400.000	Example: Input 456 into memory "M" using M+. Memory already contains value of 123. [ON/AC] [1] [2] [3] [STO] [M] M=
Manua	Angular Measurement Modes "DEG" mode:- specify measurement in "degrees". "D" symbol appears in display window. "RAD" mode:- specify measurement in "radians". "R" symbol appears in display window. "GRA" mode:- specify measurement in "grads". "G"	[sin] Sin []. 36 ² 0. When [SHIFT] [INS] are pressed, the space that is opened is displayed as "[]". The function or value assigned to the	200[+]7 [=] 28.571 The intermediate result is automatically rounded to the specified three decimal places. 28.571 round the stored [SHIFT] [Rnd] 28.571	$\begin{bmatrix} ON/AC \\ [4] [5] [6] [M+] \\ [456] \\ [M] \\ [CN/AC] \\ [RCL] [M] \\ [RCL] [M] \\ [M= 520 \\ [CON/AC] \\ [M= 520 \\ [CON$
wner's	symbol appears in display window. Display Modes "FIX" mode:- specify number of decimal places. "Fix" symbol appears in display window. "SCI" mode:- specify number of significant digits. "Sci" symbol appears in display window.	next key you press will be inserted in the []. To exit from the insertion mode, move the cursors, or press [SHIFT] [INS], or press [=]. Even after the [=] key has been pressed to calculate a result, it is possible to use this procedure for correction. Press the [] key to move the cursor to the place where	the specified three decimal places [×] Ans × [×] (upper display) 14 [=] 399,994 Cancel specification by [MODE][MODE][MODE][3][1] 399.994 specifying "Norm" again.	<u>5</u> 79.
O Please read before using. - <th>-4-</th> <th>the correction is to be made. -8- </th> <th></th> <th> -16- +</th>	-4-	the correction is to be made. -8- 		 -16- +
Safety Precautions Be sure to read the following safety precautions before using this calculator. Keep this manual handy for later reference. Batteries • After removing the batteries from the calculator, put	 "NORM" mode:- cancels "Fix" and "Sci" specifications. Note:- Mode indicators appear in the lower part of the display. The "COMP", "SD", and "REG" modes can be used in combination with the angle unit modes. Be sure to check the current calculation mode (COMP, SD, 	 Arithmetic Operations & Parenthesis Calculations Arithmetic operations are performed by pressing the keys in the same order as noted in the formula. For negative values, press [(-)] before entering the value For mixed basic arithmetic operations, multiplication and division are given priority over addition and subtraction Assuming that display mode "Norm 1" is selected. 	Specifying the Number of Significant Digits This specification is used to automatically round intermediate results and final results to the number of digits you have specified. As with the number of decimal places, displayed results are rounded to the specified number of digits, but stored	Special Functions Answer Function This unit has an answer function that stores the result of the most recent calculation. Once a numeric value or numeric expression is entered and [=] is pressed, the result is stored by this function.
them in a safe place where there is no danger of them getting into the hands of small children and accidently swallowed. • Keep batteries out of the reach of children. If accidentally swallowed, consult with a physician immediately.	REG and angle unit mode (DEG, RAD, GRA) before beginning a calculation. Calculation Priority Sequence Calculations are performed in the following order of	Example Operation Display (Lower) 23 + 4.5 - 53 = -25.5 23 [+] 4.5 [-] 53 [=] -25.5	results are normally not rounded. To specify the number of significant digits (Sci.), select [SCI] in the sub-menu "FIX/SCI/NORM" and then you are asked to enter a value indicating the number of significant	To recall the stored value, press the [Ans] [=] key. When [Ans] is pressed, "Ans" will appear on the display, and the value can be used in subsequent calculations.
 Never charge batteries, try to take batteries apart, or allow batteries to become shorted. Never expose batteries to direct heat or dispose of them by incineration. Misuse of batteries can cause them to leak acid that can 	 are provided with the following order of precedence: 1. Coordinate transformation: Pol(x, y), Rec(r, θ) 2. Type A functions :- These functions are those in which the value is entered and than the function key is pressed, such as x², x⁻¹, xl, 	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	digits (0~9) as below. Sci 0~9? Note: "0" indicating 10 significant digits.	Example: 123+456 = 579 789-579 = 210 [ON/AC][1][2][3][+][4][5][6][=] 123+456 579.
cause damage to nearby items and creates the possibility of fire and personal injury. • Always make sure that a battery's positive (+) and negative (-) sides are facing correctly when you load it into the calculator.	o [™] 3. Powers and roots, x ^y , [×] √ 4. Fractions, a ^b /c 5. Abbreviated multiplication format in front of π, memory name or variable name, such as 2π, 5Α, πΑ, etc.	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Meanwhile, the "Sci" indicator will appear on the display. Example Operation Display (Lower) 100÷6 = 16.666666666 100[÷]6 [=] 16.666666667	[7][8][9][-][Ans] [=] [789-Ans779.
 Remove the batteries if you do not plan to use the calculator for a long time. Use only the type of batteries specified for this calculator in this manual. Do not mix old and new batteries. Do not mix alkaline, 	6. Type B functions :- These functions are those in which the function key is pressed and then the value is entered such as $\sqrt{,} \sqrt[3]{,} \log$, $\ln, e^x, 10^x$, sin, cos, tan, sin ⁻¹ , cos ⁻¹ , tan ⁻¹ , sinh, cosh, tanh, sinh ⁻¹ , cosh ⁻¹ , tanh ⁻¹ , (-).	please note that internal calculation is calculated in 12 digits for a mantissa and the result is displayed and rounded off to 10 digits. $3 + 5 \times 6 = 33$ $3 [+] 5 [\times] 6 [=]$ 33.	specify 5 significant [Mode][Mode][Mode][2][5] 1.6667 ⁰¹ digits	Numeric values with 12 digits for a mantissa and 2 digits for an exponent can be stored in the " Ans " memory. The " Ans " memory is not erased even if the power of the unit
 bot not mix of and new batteries. Do not mix anality, standard (carbon-zinc), or rechargeable (nickle cadmium) batteries. Battery Contains Mercury. Do Not Put in Trash. Recycle or Manage as Hazardous Waste. 	 7. Abbreviated multiplication format in front of Type B functions, such as, 2√3, A log2, etc. 8. Permutation, combination, nPr, nCr 9. ×, ÷ 10. +, - 	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Shifting the Decimal Place You can use the key [ENG] to shift the decimal point of the displayed value three places to the left or right. Each 3-place shift to the left is the same as dividing the value	is turned OFF. Each time [=], [Shift] [%], $(M+]$, [Shift] [M–], and [STO] ∞ ($\infty = A \sim F$, M, X, Y) is pressed, the value in the Ans memory is replaced with the new value produced by the calculation execution. When execution of a
Disposing of the Calculator • Never dispose of the calculator by burning it. Doing so can cause certain components to suddenly burst, creating the danger of fire and personal injury.	• When functions with the same priority are used in series, execution is performed from right to left for :- $e^{x}\ln\sqrt{120}$ $\rightarrow e^{x}[\ln(\sqrt{120})]$. Otherwise, execution is from left to right.	2 + 3 × (4 + 5) = 29 2 [+] 3 [×] [(] 4 [+] 5 [=] 29. Closed parentheses occurring immediately before operation of the [=] key may be omitted.	by 1000, and each shift to the right is the same as multiplying by 1000. This means that this function is useful when converting metric weights and measures to other metric units.	calculation results in an error, however, the "Ans" memory retains its current value. Note: Contents of "Ans" memory are not altered when RCL ∞ ($\infty = A \sim F$, M, X, Y) is used to recall contents of variable memory. Also, contents of "Ans" memory are not
The displays and illustrations (such as key markings) shown in this Owner's Manual are for illustrative purposes only, and may differ somewhat from the actual items they represent. The contents of this manual are subject to change without notice.	 Operations enclosed in parentheses are performed first. Stacks This calculator uses memory areas, called "stacks", to temporarily store values (numeric stack) and commands (command stack) according to their precedence during calculations. The numeric stack has 10 levels and the command stack has 24 levels. A stack error (stk ERROR) 	$ \begin{array}{c} (7-2)\times(8+5)=65 \\ ([]7[-]2[)][(]8[+]5[=] \\ occurring immediately \\ obcore an open paramtheses \\ can be omitted. \\ \hline 10-\{2+7\times(3+6)\} \\ =-55 \\ \end{array} \begin{array}{c} 10[-][(]2[+]7[(]3[+] \\ -55. \\ 6[=] \\ \end{array} \end{array} $	Example Operation (Lower) 123m×456 = 56088m 123[×]456 [=] 56088. = 56.088km [ENG] 56.088 ⁰³ 78g×0.96 = 74.88g 78[×]0.96 [=] 74.88 = 0.07488kg [SHIFT] [ENG] 0.07488 ⁰³	 altered when variables are input when the variable input prompt is displayed. Omitting the multiplication sign (×) When inputting a formula as it is written, from left to right, it is possible to omit the multiplication sign (×) in the following cases :-
-1-	occurs whenever you try to perform a calculation that is so complex that the capacity of a stack is exceeded.	-9-	 13 -	
Handling Precautions • Be sure to press the "ON/AC" key before using the	Error Loacator Pressing [4] or [•] after an error occurs display the	Percentage Calculations Use the "COMP" mode for percentage calculations.	Memory This calculator contains 9 standard memories. There are	I • Before the following functions :- i sin, cos, tan, sin ⁻¹ , cos ⁻¹ , tan ⁻¹ , sinh, cosh, tanh, sinh ⁻¹ ,
calculator for the first time. • Even if the calculator is operating normally, replace the battery at least once every three years. Dead battery can leak, causing damage to and malfunction of the calculator. Never leave the dead battery in the calculator. • The battery that comes with this unit discharges slightly during shipment and storage. Because of this, it may	calculation with the cursor positioned at the location where the error occured. Overflow and Errors The calculator is locked up while an error message is on the display. Press [ON/AC] to clear the error, or press [4] or [+] to display the calculation and correct the problem.	Example Operation Display (Lower) Percentage 26% of \$15.00 15 [×]26 [SHIFT] [%] 3.9 Ratio 75 is what % of 250? 75[+]250 [SHIFT] [%] 30.	two basic types of memories, i.e., "variable" memories, which are accessed by using the [STO] and [RCL] keys in combination with the alphabets A, B, C, D, E, F, M, X and Y. The "independent" memory, which is accessed by using the [M+], [Shift] [M–] and [RCL] and [M] keys. The independent memory uses the same memory area as variable M.	$\begin{array}{c} \cosh^{-1}, \tanh^{-1}, \log, \ln, 10^{x}, e^{x}, \sqrt{,}^{3}\sqrt{,} \operatorname{Pol}(x, y), \operatorname{Rec}(r, \theta) \\ example: 2sin 30, 10 \log 1.2, 2\sqrt{3}, 2\operatorname{Pol}(5, 12), etc. \\ \end{array}$ $\begin{array}{c} \bullet \text{Before fixed numbers, variales and memories :-} \\ example: 2\pi, 2AB, 3Ans, etc. \\ \end{array}$ $\bullet \text{Before parentheses :-} \end{array}$
 require replacement and storage, because orthis, it may require replacement scorage, because orthis, it may battery life. Low battery power can cause memory contents to become corrupted or lost completely. Always keep written records of all important data. 	 "Ma ERROR" caused by:- Calculation result is outside the allowable calculation range. Attempt to perform a function calculation using a value 	Specifying the Format of Calculation Results You can change the precision of calculation results by specifying the number of decimal places or the number of significant digits. You can also shift the decimal place of a	Contents of both the variable and independent memories are protected even when the power is turned OFF. Variable memories Up to 9 values can be retained in memory at the same	Continuous Calculation Function Even if calculations are concluded with the [=] key, the result obtained can be used for further calculations. In
Avoid use and storage in areas subjected to temperature extremes. Very low temperatures can cause slow display response, total failure of the display, and shortening of battery life. Also avoid leaving the calculator in direct	that exceeds the allowable input range. • Attempt to perform an illegal operation (division by zero, etc.). Action	displayed value three places to the left or right for one-touch conversions of metric weights and measures. Upon power up reset, the display format is defaulted at	time, and can be recalled when desired. Example: Input 123 into memory "A" :- [ON/AC] 123 123	 this case, calculations are performed with 10 digits for the mantissa which is displayed. Example: To calculate ÷3.14 continuing after 3×4=12
sunlight, neara window, near a heater or anywhere else it might become exposed to very high temperatures. Heat can cause discoloration or deformation of the calculator's case, anddamage to internal circuitry. • Avoid use and storage in areas subjected to large	 Check your input values and make sure they are all within the allowable ranges. Pay special attention to values in any memory areas you are using. "Stk ERROR" caused by:- 	"Norm1". Each time when you press "[MODE] [MODE] [MODE] [3]" you can choose either "Norm 1" or "Norm 2" by keying in [1] or [2] respectively. Norm 1 :- all values less than 10 ⁻² or greater than 10 ⁹ are automatically expressed as exponents.	[STO] [A]	[ON/AC] [3] [×] [4] [=] 3x4 g12. (continuing) [÷] [3] [•] [1] [4] Ans÷3.14 g12.
amounts of humidity and dust. Take care never to leave the calculator where it might besplashed by water or exposed to large amounts of humidity or dust. Such elements can damage internal circuitry. • Never drop the calculator or otherwise subject it to	 Capacity of the numeric stack or operator stack is exceeded. Action Simplify the calculation. The numeric stack has 10 levels and the operator stack has 24 levels. 	Norm 2 :- all values less than 10 ⁻⁹ or greater than 10 ⁹ are automatically expressed as exponents. Note: You cannot specify the display format (Fix, Sci) while the calculator is in Base-N mode.	[ON/AC] [RCL][A] [RCL][A] [A= 123.	[=] Ans÷3.14 3.821656051
strong impact. • Never twist or bend the calculator. Avoid carrying the calculator in the pocket of your trousers or other tight-fitting clothing where it might be subjected to twisting or bending.	Divide your calculation into two or more separate parts. "Syn ERROR" caused by:- Attempt to perform an illegal mathematical operation. Action	Specifying the Number of Decimal Places The calculator always performs calculations using a 10-digit mantissa and 2-digit exponent, and results are stored in memory as a 12-digit mantissa and 2-digit exponent no matter how many decimal places you	When formulas are input, the result of the formula's calculation is retained in memory. Example: Input the result of 123×456 into memory "B" :-	<pre>Example: To calculate 1÷3×3 = [AC][1][+][3][×][3][=] [1:3x3] [1][+][3][=] [1:3x3] </pre>
Never try to take the calculator apart. Never press the keys of the calculator with a ball-point pen or other pointed object. Use a soft, dry cloth to clean the exterior of the unit. If the	Press to display the calculation with the cursor located at the location of the error. Make necessary corrections. Number of Input/output Digits and Calculation Digits	specify. Intermediate results and final results are then automatically rounded off to the number of decimal places you have specified. It should be noted that displayed results are rounded	[ON/AC] 123 [×] 456 [STO] [B]	$\begin{bmatrix} 1 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\$
calculator becomes very dirty, wipe it off with acloth moistened in a weak solution of water and a mildneutral household detergent. Wring out all excess moisture before wiping the calculator. Never use thinner, benzine or other volatile agents to clean the calculator. Doing so can remove printed markings and damage the case.	The memory area used for calculation input can hold 79 "steps". One function comprises one step. Each press of numeric or $+$, $-$, \times and \div keys comprise one step. Though such operations as [SHIFT] [x!] (x ⁻¹ key) require two key operations, they actually comprise only one function, and, therefore, only one step. These steps can be confirmed using the cursor. With each press of the [4] or	to the specified number of decimal places, but stored results are normally not rounded. To specify the number of decimal places (Fix), press "[MODE] [MODE] [1]" and then a value indicating the number of decimal places (0~9). Fix 0~9?	[ON/AC] [RCL][B] [RCL][B] [B= 56088.	
-2-	[▶] key, the cursor is moved one step. -6-	At this time, you should be able to see "Fix" on the display. The number of decimal places specified will remain in – 10 –	- 14 -	 - 18 -
Two-lines Display	Whenever you input the 73rd step of any calculation, the cursor changes from "_" to "■" to let you know memory is running low. If you still need to input more, you should divide you calculation into two or more parts.	effect until "Norm" (to select "Norm" press "[MODE] [MODE] [MODE] [3]") is specified or significant digits are specified using "[MODE] [MODE] [MODE] [2]". [ON/AC] [MODE] [COMP SD REG	If a variable expression is entered, the expression is first calculated according to the values stored in the variable memories used in the expression. The result is then stored in the variable memory specified for the result. Example: Input the results of A×B into memory "C" :-	$\begin{array}{c} + & - & - & - & - & - & - & - & - & - &$
You can simultaneously check the calculation formula and its answer. The first line displays the calculation formula.	When numeric values or calculation commands are input, they appear on the display from the left. Calculation results, however, are displayed from the right. The allowable input/output range (number of digits) of	[MODE] Deg Rad Gra 1 2 3	[ON/AC] [ALPHA] [A] [X] [ALPHA] [B] [STO] [C] [STO] [C] [C= 6898824.	(continuing) [x ²]
Keys Layout	this unit is 10 digits for a mantissa and 2 digits for the exponent. Calculations, however, are performed internally with a range of 12 digits for a mantissa and 2 digits for an exponent.	[MODE] [1] [MODE] Fix Sci Norm 1 2 3 Fix 0~9?	[ON/AC]	Replay Function This function stores formulas that have been executed. After execution is complete, pressing either the [4] or
SHIFT ALPHA REPLAY MODE OFF	Example: $3 \times 10^5 \div 7 =$ $3[EXP]5[+]7[=]$ $3E5 \div 7$ $42857.1\frac{4}{3}286$ $3[EXP]5[+]7[-]42857[=]$ $3E5 \div 7 - 42857$ 0.1428571	[4] (to specify 4 decimal places) - 0.0000	6898824. Deleting memories To delete all contents of variable memories, press [Shift] followed by [McI] [=].	 [•] key will display the formula executed. Pressing [•] will display the formula from the beginning, with the cursor located under the first character. Pressing [•] will display the formula from the end, with the cursor located at the space following the last
$\begin{array}{c c} x_{l} & nPr & Rec(& \sqrt[3]{V} & \\ \hline x^{-1} & nCr & Pol(& \sqrt[3]{V} & x^{3} & x^{y} \\ \hline exp & \frac{d_{l_{c}}}{e^{x}} & \sqrt{v} & x^{2} \\ \hline ENG & \frac{d_{b_{c}}}{e^{b_{c}}} & \sqrt{v} & x^{2} \\ \end{array}$	Corrections To make corrections in a formula that is being input, use the [4] and [b] keys to move to the position of the error	[ON/AC][MODE] [MODE] [MODE] [COMP SD REG 1 2 3	Independent Memory Addition and subtraction (to and from sum) results can be stored directly in memory. Results can also be totalized in memory, making it easy to calculate sums. The icon "M"	 character. After this, using the [•] and [4] to move the cursor, the formula can be checked and numeric values or commands can be changed for subsequent execution. Example:
$\begin{array}{c} A & \leftarrow B \\ \hline (-) \\ \hline (-)$	and press the correct keys. Example: To change an input of 122 to 123 :- [1] [2] [2] 122_ 0.	[MODE] Fix Sci Norm 1 2 3	will be lighted as long as M is not empty. Example: Input 123 to independent memory. [ON/AC] [1] [2] [3] 1230.	[ON/AC] [1] [2] [3] [×] 123x456 [4] [5] [6] [=] 56088. [▶] 123x456
$ \begin{array}{c} $	$\begin{bmatrix} 1 \end{bmatrix} \qquad \begin{bmatrix} 12\underline{2} \\ 3 \end{bmatrix} \qquad \begin{bmatrix} 123_{-} \\ 2 \end{bmatrix} $	[3] [1] [1] [1] [1] [1] [1] [1] [1	[M+] Recall memory data [ON/AC]	$\begin{bmatrix} - & 56088. \\ 1 & [=] \\ 1 & 56088. \end{bmatrix}$
$\begin{array}{c} \overbrace{y}{\overline{y}} \\ 4 \\ \overbrace{z}{\overline{y}} \\ \hline{x} \\ \overline{x} \\ $	Example: To change an input of cos60 to sin60 :- [cos] [6] [0] $\begin{bmatrix} \cos 60 \\ \pi \end{bmatrix}$	Example Operation (Lower) 100 ÷ 6 = 16.66666666 100 [÷] 6 [=] 16.666667 specify 4 decimal places [MODE][MODE][MODE][1][4] 16.66667 cancel specification [MODE][MODE][MODE][MODE] [3] [1] 16.66666667	[RCL] [M] Add 25, subtract 12	$\begin{bmatrix} 4 \\ 56088 \end{bmatrix}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	[4][4][4] [sin] [sin 60	200÷7×14 = 400 200[÷]7 [×] 14[=] 400. rounded to 3 decimal [MODE][MODE][MODE][1][3] 400.000 places 200 [÷]7[=] - - - 28.571 The intermediate result is 1 - <t< th=""><th>25 [M+] 12 [SHIFT] [M-] Recall memory data [ON/AC] 0.</th><th> </th></t<>	25 [M+] 12 [SHIFT] [M-] Recall memory data [ON/AC] 0.	
-3-		automatically rounded to the specified three decimal places.	[RCL][M] M= <u>1</u> 36.	 19

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Example	Operation	Display (Lower)
ercentage		
5% of \$15.00	15 [×]26 [SHIFT] [%]	3.9

[2] [3] [510] [M]	M=	
	м	<u>1</u> 23.
[5] [6] [M+]	456	
[0][0][m]]	450 M	456 .
	— м	_ o.
	M=	
	M= M	579.

Example:	<i>r</i>	I			Display	Example 5 30 [DT] 5		
$4.12 \times 3.58 + 6.4 = 21.1496$ $4.12 \times 3.58 - 7.1 = 7.6496$		I	Example Using any four numbers	Operation 7[SHIFT][nPr]4[×]3[÷]	(Lower) 360.		[] [;] 31 [DT], press [SHI 20 [SHIFT] [;] 31 [DT] 4	
[ON/AC] [4] [•] [1] [2] [×]	•	x3.58+6.→	from 1 to 7, how many	7[5HIF1][nPr]4[×]3[÷]	360.		[] [;] 31 [DT], press 120	
[3] [•] [5] [8] [+] [6] [•] [4]	ł] [=]	21.1496	four digit even numbers			[SHIFT] [CL].		-1
		1	can be formed if none of	-			T] [√] 20 [DT] [√] 30 [D], press [√] 20 [=] [Ans]	
[4]	-12×3	.58+6.4_	the four digits consist of the same number?	ſ			T] [√] 20 [DT] [√] 30 [DT	
		21.1496	(3/7 of the total number	r		To delete [√] 20 [DT]	, press [√] 20 [SHIFT] [;] [(–)] 1 [DT].
			of permutations will be			Destanting a last	•	
[4][4][4][4]	4.12:	×3.58 <u>+</u> 6.→ 21. <u>1</u> 496	even.)			Performing calculat	ions lures are used to perfor	m the various
		21.1490	$7P4 \times 3 \div 7 = 360$ If any four items are	10[nCr]4[=]	210.	standard deviation ca		in the various
[-][7][•][1]	-12x3	.58-7.1_	removed from a total	10[11C1]4[=]	210.	Key operation	Result	
		21.1496	of 10 items, how many			[SHIFT][xơn]	Population standard devi	ation, xon
			different combinations			[SHIFT][x\sigman-1]	Sample standard deviatio	n, xσ _{n-1}
[=]	4.12:	×3.58-7.→ 7. <u>6</u> 496	of four items are			[SHIFT][x]	Mean, x	_
		7.0450	possible? 10C4 = 210			[RCL][A]	Sum of square of data, $\sum x$	2
The replay function is no	ot cleared even wh	en [ON/AC] is	If 5 class officers are	25[nCr]5[-]15[nCr]5[=]	50127.	[RCL][B] [RCL][C]	Sum of data, $\sum x$ Number of data, n	
pressed or when power is		ontents can be	being selected for a					
recalled even after [ON/A	AC] is pressed.		class of 15 boys and				nd mean calculations a	are performed
Replay function is cleare	red when mode o	r operation is	10 girls, how many			as shown below:	deviation $\sigma_n = \sqrt{\sum_{i=1}^{n} x_i - \bar{x}_i}$	z)2/")
switched.	ica when mode o		combinations are possible? At least one			where $i = 1$ to n	$\Delta C = V(\Delta \alpha_l)$	() ///)
			girl must be included			Sample standard dev	iation $\sigma_{n-1} = \sqrt{(\sum (x_i - \overline{x})^2)}$	2/(n-1))
Error Position Display Fu			in each group.			where $i = 1$ to n		
When an ERROR messa			25C5-15C5 = 50127			Mean $x = (\sum x)/n$		
execution, the error car [ON/AC] key, and the valu						Example	Operation	Display
from the beginning. How			Other Functions (\checkmark ,	x ² , x ⁻¹ , x!, ³ √, Ran#)		Data 55, 54, 51, 55, 53,	[MODE][2] (SD Mode)	0.
key, the ERROR message is	is cancelled and the			1		53, 54, 52	[SHIFT][ScI][=] (Memory cleared)	0.
to the point where the err	rror was generated.	I			Display		55[DT]54[DT]51[DT]	
-			Example	Operation	(Lower)		55[DT]53[DT][DT]54[DT]	
Example: 14÷0×2.3 is in [ON/AC] [1] [4] [÷] [0] [×		I	$\sqrt{2+\sqrt{5}} = 3.65028154$ $2^2+3^2+4^2+5^2=54$	$[\sqrt{2}][+][\sqrt{5}]=]$	3.65028154 54.	What is deviation of the	52[DT] [RCL][C](Number of data)	<u> </u>
[2] [.] [3] [=]	VI 1	ia ERROR	$2^{2}+3^{2}+4^{2}+5^{2}=54$	$2[x^2][+]3[x^2][+]4[x^2]$ [+]5[x^2][=]	54.	unbiased variance, and	[RCL][B](Sumof data)	427.
			$(-3)^2 = 9$	$[(][(-)]3[)][x^2][=]$	9.	the mean of the above	[RCL][A](Sum of square of data)	22805.
[◀] (or [▶])	14÷01	x2.3	1/(1/3-1/4) = 12	$[(]3[x^{-1}][-]4[x^{-1}][)][x^{-1}][=]$	12.	data?	$[SHIFT][\overline{x}][=](Mean)$	53.375
		0.	8! = 40320	8[SHIFT][x!][=]	40320.		[SHIFT][XOn][=](Population SD)	1.316956719
Correct the input by press	sing	I	$^{3}\sqrt{(36 \times 42 \times 49)} = 42$	$[^{3}\sqrt{]}[(]_{36}[\times]_{42}[\times]_{49}[)][=]$	42.		$[SHIFT][x\sigma_{n-1}][=](Sample SD)$ $[SHIFT][x\sigma_{n-1}]$	1.407885953
[4] [SHIFT] [INS] [1]	·	Dx2.3	Random number generation (number is in the range of 0.000 to	[SHIFT][Ran#][=]	(random)		[X ²][=](Sample variance)	1.982142857
	14÷1							
		0. 0x2.3 3.22	0.999)	- 24 -		 	- 28 -	
[=] — — — — — — — — — — — — — — — — — — —		Dx2.3		-24-	Display	 		
[=] — — — — — — — — — — — — — — — — — — —	-20-			Operation	Display (Lower)	In the REG mode, cal	— — — — — — ion culations including line	
[=]	-20-		Example v(1-sin ² 40)	Operation [MODE][1]("DEG" selected]		In the REG mode, cal logarithmic regressi	— — — — — — — ion culations including line on, exponential regre	ession, power
[=] — — — — — — — – Scientific Function Trigonometric function	-20-	Dx2.3 3.22		Operation [MODE][MODE][1]\CDEG* selected] [√][(]1[-][([[sin]40[)][x²])	(Lower)	In the REG mode, cal logarithmic regressi	— — — — — — ion culations including line	ession, power
[=] Scientific Function Trigonometric function functions • Be sure to set the unit a performing trigonome	-20 - ms and inverse t c of angular measu hetric function	a a bx 2 . 3 a 3.22 a rigonometric a rement before b	Example v(1-sin ² 40)	Operation [MODE][1]("DEG" selected]		In the REG mode, cal logarithmic regressi regression, inverse r can be performed.	ion culations including line on, exponential regre egression and quadra	ession, power
[=] Scientific Function Trigonometric function functions • Be sure to set the unit performing trigonome trigonometric function of	-20 - ns and inverse t of angular measu netric function calculations.	a a a a	Example v(1-sin ² 40)	Operation [M0DE][M0DE][1]^DEG" selected) [v][(1]-][(][sin]40)][x ²] [)][=] [SHIFT][cos ⁻¹][Ans][=] 2[SHIFT][xl][x ⁻¹][+]	(Lower) 0.766044443	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e	ion culations including line on, exponential regre egression and quadra enter the "REG" mode:	ession, power
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[=] Scientific Function Trigonometric function functions • Be sure to set the unit performing trigonome trigonometric function of	-20- ms and inverse t of angular measu netric function calculations. measurement (deg b-menu.	Dx2.3 3.22	Example v(1-sin ² 40) = 0.766044443 1/2!+1/4!+1/6!+1/8!	Operation [MODE][MODE][1](rDEG' selected) [V][(1 [-]]([Sin]40)][x ²] [)][=] [SHIFT][cos ⁻¹][Ans][=] 2[SHIFT][x1][x ⁻¹][+] 4[SHIFT][x1][x ⁻¹][+] 6[SHIFT][x1][x ⁻¹][+]	(Lower) 0.766044443 40.	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S	ion culations including line on, exponential regre egression and quadra enter the "REG" mode:	ession, power
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[=] Scientific Function Trigonometric function functions • Be sure to set the unit 1 performing trigonometric function of • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Op sin 63°52'41" [MODE = 0.897859012 [sin] 41 [° cos (π/3 rad) = 0.5 [MODE]	14+10 -20- ns and inverse t of angular measu hetric function calculations. measurement is set t is set. Settings a d OFF. DEJ[MODE][1]("DEG" selected) 1) 63 (" "] 52 (" "] [0" "] (=) DEJ[MODE][2]("RAD" selected) s]((] (SHIFT)[(\pi][+]3	Image: state stat	Example v(1-sin²40) = 0.766044443 1/2!+1/4!+1/6!+1/8! = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Ligits of a fraction denominator + separ Example	Operation [MODE][MODE][1]CDEG*selected] [v][(1[-][(0[sin]40)][x²]) [D][=] [SHIFT][cos-1][Ans][=] 2[SHIFT][x][x-1][+] 4[SHIFT][x][x-1][+] 6[SHIFT][x][x-1][+] 8[SHIFT][x][x-1][+] 9[SHIFT][x][x-1][+] 9[SHIFT][x][x-1][+] 9[SHIFT][x][x-1][+] 9[SHIFT][x][x-1][+] 9[SHIFT][x][x-1][x-1][+] 9[SHIFT][x][x-1][x-1][x-1][+] 9[SHIFT][x][x-1][x-1][x-1][x-1][x-1][x-1][x-1][(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator +	In the REG mode, cal logarithmic regressis regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one co Lin: linear regression Log: logarithmic regre Exp: exponential regre press [•] for the other	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 5D REG 2 3 of the following regression cossion ession ession	ession, power tic regression on types:-
[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric function of trigonometric function of trigonometric function of angular n grads) is selected in sub- • The unit of angular n grads) is selected in sub- • Once a unit of angular n effect until a new unit when power is switched Example Op sin 63°52′41″ [MODE] = 0.897859012 [sin] ≤ (x/3 rad) = 0.5 [MODE] [D] [= [D] [=	14+10 -20- ns and inverse t of angular measu netric function calculations. measurement (deg b-menu. measurement is set t is set. Settings a d OFF. DE][MODE][1]("DEG" selected) b] 63 [0" "] 52 [0" "] DE][MODE][2]("RAD" selected) b][0] SHIFT][\pi][+]3 [=]	rigonometric and inverse grees, radians, t, it remains in re not cleared	Example $\sqrt{(1-sin^240)}$ $= 0.766044443$ $1/2!+1/4!+1/6!+1/8!$ $= 0.543080357$ FractionsFractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ	$\begin{tabular}{ l l l l l l l l l l l l l l l l l l l$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower)	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regr press [+] for the other	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 5D REG 2 3 of the following regression f the following regression ession ession er three regression type	ession, power tic regression on types:-
[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric function of trigonometric function of trigonometric function of the unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Opper sin 63°52′41″ sin 63°52′41″ [MODE cos] [Sin] 41 [° cos (π/3 rad) = 0.5 cos (π/3 rad) = 0.5 [MODE cos] [D] [= tan (-35 grad)	14+10 -20- ns and inverse t of angular measu hetric function calculations. measurement is set t is set. Settings a d OFF. DEJ[MODE][1]("DEG" selected) 1) 63 (" "] 52 (" "] [0" "] (=) DEJ[MODE][2]("RAD" selected) s]((] (SHIFT)[(\pi][+]3	Image: state stat	Example v(1-sin²40) = 0.766044443 1/2!+1/4!+1/6!+1/8! = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Ligits of a fraction denominator + separ Example	$\label{eq:constraint} \hline \begin{array}{ c c c c c c c c c c c c c c c c c c c$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_20.	In the REG mode, cal logarithmic regression regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regr press [+] for the other 1	ion culations including line on, exponential regre egression and quadration enter the " REG " mode: $\frac{5D \ REG}{2 \ 3}$ of the following regression $\frac{5D \ REG}{2 \ 3}$ ession ession er three regression type $\frac{5D \ REG}{2 \ 3}$	ession, power tic regression on types:-
[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric functions • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Opp sin 63°52′41" [MODE [cos]] cos (π/3 rad) = 0.5 [MODE [cos]] tan (-35 grad) [MODE [cos]] = -0.612800788 [CGRA*	14+10 -20- Ins and inverse t of angular measu netric function calculations. measurement (deg b-menu. measurement is set t is set. Settings a d OFF. DE[[MODE[[1][rDEG" selected] b] 63 [° ''] 52 [° ''] [° ''][=] DE[[MODE][2][rRAD" selected] b] 63 [° ''] 52 [° ''] [° ''][=] DE[[MODE][2][rRAD" selected] b] [0 [SHIFT][\pi][+]3 =] DE[[MODE][3]	Image: state stat	Example v(1-sin²40) = 0.766044443 1/2!+1/4!+1/6!+1/8! = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Ligits of a fraction denominator + separ Example	$\label{eq:product} \hline \textbf{Operation} \\ \hline \textbf{[MODE][MODE][1]_{(DEG' selected]}} \\ \hline \textbf{(Y][01[-][([[sin]40)]]x^2]} \\ \hline \textbf{(J][1]-][([sin]40]]x^1][+1]} \\ \hline \textbf{4}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{4}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{4}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{8}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{8}[SHIFT][x][x^{-1}][=1] \\ \hline \textbf{nd} \ displayed in the ordonominator. Values are comminator. Value (interger + rator marks) exceeds 10. \\ \hline \textbf{Operation} \\ 2[a^b/c]5[+]3[a^b/c]1[[a^b/c]4[-]] \\ [a^b/c](conversion to decimal) \\ \hline \textbf{V} = \frac{V_{conversion}}{V_{conversion}} \ \textbf{V} = V_{conversion$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower)	In the REG mode, cal logarithmic regression regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regr press [•] for the othe -Pwr In 1	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 5D REG 2 3 of the following regression f the following regression cession ession ession er three regression type 2 3 n	ession, power tic regression on types:-
[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric function of • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Op sin 63°52'41" [MODE = 0.897859012 [sin] 41 [0] (cos (π /3 rad) = 0.5 [MODE tan (-35 grad) [MODE = -0.612800788 (GRA* [tan] 2sin45°×cos65° [MODE	14+10 -20- ms and inverse to to f angular measuse to f angular	B Dx 2 . 3 3.22 Image: second	Example v(1-sin²40) = 0.766044443 1/2!+1/4!+1/6!+1/8! = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Ligits of a fraction denominator + separ Example	$\label{eq:constraint} \hline \begin{array}{ c c c c c c c c c c c c c c c c c c c$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_20.	In the REG mode, cal logarithmic regression regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regr press [+] for the other 1	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 3D REG 2 3 of the following regression 2 3 ession ession er three regression type a y Quad 2 3 n	ession, power tic regression on types:-
[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric function of • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Opp sin 63°52′41″ [MODE = 0.897859012 [sin] 41 [° cos (π /3 rad) = 0.5 [MODE = -0.612800788 [CGA* [tan] 2sin45°×cos65° = 0.597672477 2[sin]	14+10 -20- Ins and inverse t in calculations. measurement (degrades) is set. Settings a d OFF. peration DE[MODE[1](DEG'selected) is[0] [SHIFT][n][+]3 i=] DE[MODE[2](TAD'selected) is[1] [SHIFT][n][+]3 i=] DE[MODE[1](DEG') in [45 [cos] 65 [=]	B Dx 2 . 3 3.22 inverse inverse grees, radians, t, it remains in re not cleared Display (Lower) 0.897859012 0.5 -0.612800788 0.597672477	Example $\sqrt{(1-\sin^2 40)}$ $= 0.766044443$ $1/2!+1/4!+1/6!+1/8!$ $= 0.543080357$ FractionsFractions are input a numerator and den displayed in decimal digits of a fraction denominator + separExample $^{2}/_{5+3}1/_{4}=3^{13}/_{20}$	$\label{eq:product} \hline \textbf{Operation} \\ \hline [MODE][MODE][1](rDEG' selected) \\ [V][[0][-1]([0][sin]40)][x^2] \\ [D][=] \\ [SHIFT][cos^-1][Ans][=] \\ [SHIFT][x1][x^-1][+] \\ [SHIFT][x1][x^-1][+] \\ [SHIFT][x1][x^-1][+] \\ [SHIFT][x1][x^-1][+] \\ [SHIFT][x1][x^-1][+] \\ [SHIFT][x1][x^-1][=] \\ \hline \textbf{nd displayed in the ordoniator. Values are of format whenever the too nominator. Values are of format whenever the too and value (interger + rator marks) exceeds 10. \\ \hline \textbf{Operation} \\ [2[a^b/c]S[+]3[a^b/c]1] \\ [a^b/c][(conversion to decimal)] \\ Fractions can be converted too decimals, and then converted back to fractions. \\ \hline \textbf{Onetal back to fractions}. \\ \hline \end{tabular}$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3,13,20. 3.65	In the REG mode, cal logarithmic regressis regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regr press [+] for the othe -Pwr In 1 Pwr: power regression Inv: inverse regression Quad: quadratic regre	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 3D REG 2 3 of the following regression 2 3 ession ession er three regression type a y Quad 2 3 n	ession, power tic regression on types:-
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[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric function of • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Opp sin 63°52′41″ [MODE = 0.897859012 [sin] 41 [° cos ($\pi/3$ rad) = 0.5 [MODE = 0.612800788 (cos) D1 [= tan (-35 grad) [MODE = 0.597672477 2[sin sin ⁻¹ 0.5 = 30 [SHIF cos ⁻¹ ($2/2$) [MODE = 0.785398163 rad [SHIF = $\pi/4$ rad [D1[=] $\pi/4$ rad [D1[=] $\pi/4$ rad [SHIF = 36°32′18.4″ [SHIF If the total number of digits for	14+10 -20- ins and inverse t is of angular measu netric function is calculations. measurement (deg bemenu. measurement is set t is set. Settings a d OFF. DEI[MODE][1]("DEG" selected) b163 [0" ''] 52 [0" ''] [0" ''][=] DEI[MODE][2]("RAD" selected) b13 [0] [SHIFT][\pi][-] DEI[MODE][2]("RAD" selected) b1[0] [SDE[1]["DEG") in] 45 [cos] 65 [=] IFT][sin -1] 0.5 [=] DEI[MODE][2]("RAD") IFT][sin -1] 0.5 [=] DEI[MODE][2]("RAD") IFT][sin -1] 0.7 [=] DEI[MODE][1]("DEG") in] 45 [cos] 65 [=] IFT][sin -1] 0.7 [=] DEI[MODE][1]("DEG") IFT][tan -1] 0.741[=] IFT] [ten -''] for degrees/minutes/substructsubstructsubstructs/substructsubstructsubstructsubstructsubstructs	B Dx 2.3 3.22 inverse grees, radians, t, it remains in re not cleared Display (Lower) 0.897859012 0.5 -0.612800788 0.597672477 30. 0.785398163 0.25 36.53844576 36*32°18.4° econds exceed	Example $\sqrt{(1-\sin^240)}$ = 0.766044443 $1/2!+1/4!+1/6!+1/8!$ = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Example $^2/5+3^{1}/4=3^{13}/20$ $3^{456}/78=8^{11}/13$ $1/2578+1/4572$	$\label{eq:product} \hline \textbf{Operation} \\ \hline \textbf{[MODE][MODE][1]_{CDGC'} selected]} \\ \hline (V][01[-][(G][sin]400][x^2] \\ D][=] \\ \hline \textbf{[SHIFT][cos^{-1}][AnS][=]} \\ \hline \textbf{2}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{4}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{4}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{8}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{8}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{8}[SHIFT][x][x^{-1}][+1] \\ \hline \textbf{8}[SHIFT][x][x^{-1}][=] \\ \hline \textbf{md} \ displayed in the ordonominator. Values are comminator. Values are commerced to a commerce dock to fractions. Operation 2[a^b/c]5[+]3[a^b/c]1 [a^b/c]45(a[a^b/c]78[=] [SHIFT][d'/c] 1[a^b/c]2578[+]1[a^b/c] 4572[=] When the total number of characters, including$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_120. 3_65 8_111_113. 115_113.	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin linear regression Log: logarithmic regre Exp: exponential regre press [\rightarrow] for the othe -Pwr In 1 Pwr: power regression Inv: inverse regression Quad: quadratic regre Linear regression cal following formula: y = A + Bx. Data input Press [MODE] [3] [1] the "REG" mode.	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 5D REG 2 3 of the following regression f the following regression ession ession er three regression type 2 3 n n ession	ession, power tic regression on types:- es:- but using the ression under
[=] Scientific Function Scientific Function Scientific Function Science Scie	14+10 -20- -	B Dx 2 . 3 3.22 inverse grees, radians, t, it remains in re not cleared Display (Lower) 0.897859012 0.5 -0.612800788 0.597672477 30. 0.785398163 0.25 36.53844576 36°32°18.4° econds exceed priority, and	Example $\sqrt{(1-\sin^240)}$ = 0.766044443 $1/2!+1/4!+1/6!+1/8!$ = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Example $^2/5+3^{1}/4=3^{13}/20$ $3^{456}/78=8^{11}/13$ $1/2578+1/4572$	$\label{eq:product} \hline \textbf{Operation} \\ \hline [MODE][MODE][1](rDEG' selected) \\ [V][(1] [-][([[sin]40)][x^2] \\])][=] \\ [SHFT][cos^-1][Ans][=] \\ 2[SHFT][x][x^-1][+] \\ 4[SHFT][x][x^-1][+] \\ 4[SHFT][x][x^-1][+] \\ 8[SHFT][x][x^-1][+] \\ 8[SHFT][x][x^-1][=] \\ \hline \textbf{ad value (interger + ator marks) exceeds 10. \\ \hline \textbf{Operation} \\ 2[a^b/c]5[+]3[a^b/c]1 \\ [a^b/c]4[=] \\ [a^b/c]4[=] \\ [a^b/c]4[=] \\ [a^b/c]4[=] \\ [a^b/c]4[a^b/c]78[=] \\ [SHFT][d^/c] \\ 1[a^b/c]2578[+]1[a^b/c] \\ 1[a^b/c]2578[+]1[a^b/c] \\ 1[a^b/c]2578[+]1[a^b/c] \\ 1[a^b/c]2578[+]1[a^b/c] \\ 1[a^b/c]2578[+]1[a^b/c] \\ 4572[=] \\ \hline When the total number of characters, including integer, numerator, denominator and delimiter mark exceeds 10, the input fraction is \\ \hline \end{tabular}$	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_120. 3_65 8_111_113. 115_113.	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin linear regression Log: logarithmic regre Exp: exponential regre press [\rightarrow] for the othe Pwr: power regression Inv: inverse regression Nu: inverse regression Cuad: quadratic regre Linear regression cal following formula: y = A + Bx. Data input Press [Shift] [Sc1] =] Input data in the foll	ion culations including line on, exponential regre egression and quadra enter the "REG" mode: 5D REG 2 3 of the following regression for the following regression erssion er three regression type 2 3 n n esssion lculations are carried of 1 to specify linear reg	ession, power tic regression on types:- ession but using the ression under nemories.
[=] Scientific Function Trigonometric function functions • Be sure to set the unit 1 performing trigonometric functions • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Opp sin 63°52'41" [MODE = 0.897859012 [sin] 11 [° cos (π /3 rad) = 0.5 [MODE = -0.612800788 [tan] 2sin45° x cos65° [MODE = 0.597672477 2 [sin] sin ⁻¹ 0.5 = 30 [SHIF cos ⁻¹ (2/2) [MODE = π /4 rad [][=] π /4 rad [][=] 36°32' 18.4" [SHIF = 36°32' 18.4" [SHIF	14+10 $-20-$ Ins and inverse t is of angular measu herric function calculations. measurement (deg b-menu. measurement is set is set. Settings a d OFF. peration DE[[MODE][1]("DEG" selected) 163 [0" "] 52 [0" "] [0" "][2] DE[[MODE][2]("RAD" selected) 163 [0" [152 [0"] [0" "][2] DE[[MODE][3] A*selected) n] (-)] 35 [=] DE[[MODE][3] FT][cos ⁻¹] (0.5 [=] DE[[MODE][2]("RAD") IFT][cos ⁻¹] (0.7 [=]) DE[[MODE][2]("RAD") IFT][cos ⁻¹] (0.7 [=]) DE[[MODE][2]("RAD") IFT][cos ⁻¹] (0.7 [=]) DE[[MODE][1]("DEG") IFT][tan ⁻¹] 0.7 41[=] IFT] [4-0" "] for degrees/minutes/ss alues are given display ot displayed. However	B Dx 2 . 3 3.22 inverse grees, radians, t, it remains in re not cleared Display (Lower) 0.897859012 0.5 -0.612800788 0.597672477 30. 0.785398163 0.25 36.53844576 36°32°18.4° econds exceed priority, and	Example $\sqrt{(1-\sin^240)}$ = 0.766044443 $1/2!+1/4!+1/6!+1/8!$ = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Example $^2/5+3^{1}/4=3^{13}/20$ $3^{456}/78=8^{11}/13$ $1/2578+1/4572$	$\label{eq:product} \hline \\ \hline $	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_120. 3_65 8_111_113. 115_113.	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin linear regression Log: logarithmic regre Exp: exponential regre press [\rightarrow] for the othe -Pwr In 1 Pwr: power regression Inv: inverse regression Quad: quadratic regres Linear regression cal following formula: y = A + Bx. Data input Press [MODE] [3] [1] the "REG" mode. Press [Shift] [Scl] [=] Input data in the foll [DT]	ion culations including line on, exponential regre egression and quadrat enter the "REG" mode: SD REG 2 3 of the following regression of the following regression ession er three regression type av Quad 2 3 n n ession culations are carried of l to specify linear reg to clear the statistical m lowing format: <x data<="" td=""><td>ession, power tic regression on types:- es:- but using the ression under ression under remories. > [,] <y data=""></y></td></x>	ession, power tic regression on types:- es:- but using the ression under ression under remories. > [,] <y data=""></y>
[=] Scientific Function Trigonometric function functions • Be sure to set the unit of performing trigonometric functions • The unit of angular m grads) is selected in sub- • Once a unit of angular m effect until a new unit when power is switched Example Opp sin 63°52'41" [MODE = 0.897859012 [sin] 41 [?] cos ($\pi/3$ rad) = 0.5 [MODE = -0.612800788 [ran] 2sin45°×cos65° [MODE = 0.783398163 rad = $\pi/4$ rad [][=] $\pi/4$ rad [][][=] $\pi/4$ rad [][][][][][][][][][][][][][][][][][][]	14 + 10 $-20 -$ ins and inverse t is of angular measus thetric function calculations. measurement (degleright) is set. Settings a d OFF. $peration$ $DE[[MODE][1](rDEG' selected) is 3[0' ''] 52 [0' ''] [0' ''][=] DE[[MODE][2](rRAD' selected) is 3[0' [SFIFT](a][+]3 =] DE[[MODE][2](rRAD' selected) is 3[0' [SFIFT](a][+]3 =] DE[[MODE][2](rRAD' selected) is 3[0] [SFIFT](a][-] DE[[MODE][1](rDEG') in] 45 [cos] 65 [-] IFT](sin -1] 0.741[-] IFT](sin -1] 0.741[-] IFT](sin -1] 0.741[-] IFT](ser -1''] for degrees/minutes/sa alues are given display iot displayed. However, it as a decimal value.$	B Dx 2 . 3 3.22 inverse grees, radians, t, it remains in re not cleared Display (Lower) 0.897859012 0.5 -0.612800788 0.597672477 30. 0.785398163 0.25 36.53844576 36°32°18.4° econds exceed priority, and	Example $\sqrt{(1-\sin^2 40)}$ = 0.766044443 $1/2!+1/4!+1/6!+1/8!$ = 0.543080357 Fractions Fractions are input a numerator and der displayed in decimal digits of a fraction denominator + separ Example $2/5+3^{1}/4=3^{13}/20$ $3^{456}/78=8^{11}/13$ $1/2578+1/4572$ = 0.00060662	$\label{eq:selected} \hline \hline \\ $	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_120. 3_65 8_111_113. 115_113. 6.066202547 ⁻⁰⁴	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regre press [\rightarrow] for the othe -Pwr In 1 Pwr: power regression Linear regression Quad: quadratic regre Linear regression cal following formula: y = A + Bx. Data input Press [Shift] [Scl] [=] Input data in the foll [DT] • When multiples of t	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 3D REG 2 3 of the following regression 2 2 3 of the following regression erssion er three regression type 2 3 n n ession lculations are carried of 1 to specify linear reg to clear the statistical m lowing format: <x data<br="">he same data are input</x>	ession, power tic regression on types:- es:- but using the ression under ression under remories. > [,] <y data=""></y>
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[=] Scientific Function Scientific Function Scientific Function functions Science Sc	1 4 + 1 0 $-20 -$ Ins and inverse t is of angular measu entric function calculations. measurement (deg b-menu. measurement is set it is set. Settings a d OFF. DE[MODE[1]["DEG" selected) 1] 63 ["" "] 52 ["" "] DE[MODE[1][DEG" is [""] 52 ["" "] DE[MODE[1][Traf] +]3 =]	B Dx 2. 3 3.22 rigonometric rement before and inverse grees, radians, t, it remains in re not cleared Display 0.897859012 0.5 -0.612800788 0.597672477 30. 0.785398163 0.25 36.53844576 36'32°18.4° econds exceed priority, and t, the entire		$\begin{tabular}{ l $	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_120. 3_65 8_111_113. 115_113. 6.066202547 ⁻⁰⁴ 0.25 -1_11_110.	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin: linear regression Log: logarithmic regre Exp: exponential regre press [\rightarrow] for the othe Pwr: power regression Log: addratic regression Nu: inverse regression Quad: quadratic regression Quad: quadratic regression Linear regression cal following formula: y = A + Bx. Data input Press [Shift] [Scl] [=] Input data in the foll [DT] • When multiples of t entry methods are p Example 1 Data: 10/, Key operation: 10 [,]	ion culations including line on, exponential regre egression and quadra enter the " REG " mode: 3D REG 2 3 of the following regression 2 3 of the following regression ersion er three regression type 1 v Quad 2 3 n n ession culations are carried of to clear the statistical m lowing format: <x data<br="">he same data are input possible: 20, 20/30, 20/30, 40/50 20 [DT]</x>	ession, power tic regression on types:- es:- but using the ression under ression under remories. > [,] <y data=""></y>
[=] Scientific Function Scientific Function Scientific Function functions Science Sc	$1 4 + 1 0$ $-20 -$ Ins and inverse to a service of angular measurement (degometric function calculations. measurement is set is set. Settings a d OFF. $DE[MODE[1]]^{CDEG^{*} selected}$ $DE[MODE[2]^{CRAD^{*} selected}$ $DE[MODE[1]]^{CDEG^{*} selected}$ $DE[MODE[1]^{CRGT}$ $DE[MODE[1]^$	B Dx 2. 3 3.22 rigonometric rement before and inverse grees, radians, t, it remains in re not cleared Display 0.897859012 0.5 -0.612800788 0.597672477 30. 0.785398163 0.25 36.53844576 36'32°18.4° econds exceed priority, and t, the entire	$\frac{\mathbf{Example}}{\sqrt{(1-\sin^240)}} = 0.766044443}$ $\frac{1}{1/2!+1/4!+1/6!+1/8!} = 0.543080357$ $\frac{\mathbf{Fractions}}{1}$ Fractions are input a numerator and den displayed in decimal digits of a fraction denominator + separt $\frac{\mathbf{Example}}{2^{7}/5+3^{1}/4=3^{13}/20}$ $\frac{3^{456}/78=8^{11}/13}{1/2578+1/4572} = 0.00060662$ $\frac{1}{2\times0.5=0.25}$ $\frac{1}{2\times(-4^{7}/5)-5^{7}/6=-1^{1}/10}$ $\frac{1}{2\times1^{3}/3+1/4\times1^{7}/5} = 1^{3}/60$	$\label{eq:product} \hline \\ \hline $	(Lower) 0.766044443 40. 0.543080357 der of integer, automatically tal number of numerator + Display (Lower) 3_113_20. 3_65 8_111_113. 115_113. 6.066202547 ⁻⁰⁴ 0.25 -1_11_110. 13_60.	In the REG mode, cal logarithmic regressi regression, inverse r can be performed. Press [MODE] [3] to e COMP S 1 and then select one c Lin Log: logarithmic regres Exp: exponential regression Log: logarithmic regression Log: logarithmic regression Press [\rightarrow] for the othe -Pwr In 1 Pwr: power regression Inv: inverse regression Quad: quadratic regression Cuad: quadratic regression Linear regression cal following formula: y = A + Bx. Data input Press [MODE] [3] [1] the "REG" mode. Press [Shift] [Scl] [=] Input data in the foll [DT] • When multiples of t entry methods are p Example 1 Data: 10/7 Key operation: 10 [.] 20 [.]	ion culations including line on, exponential regre egression and quadra enter the "REG" mode: D REG 2 3 of the following regression of the following regression er three regression type 2 3 n n h ession iculations are carried of colear the statistical m lowing format: <x data<br="">he same data are input possible: 20, 20/30, 20/30, 40/50 20 [DT] 30 [DT] [DT]</x>	ession, power tic regression on types:- es:- but using the ression under ression under remories. > [,] <y data=""></y>
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1	[SHIFI][XOn-1][:
1	[SHIFT][xon-1]
	[X ²][=](Sample varia

Scientific Function

Trigonometric functions a

Example	Operation	Display (Lower)
sin 63°52'41"	[MODE][MODE][1]("DEG" selected)	
= 0.897859012	[sin] 63 [° ' "] 52 [° ' "]	
	41 [°'"][=]	0.897859012
$\cos(\pi/3 \text{ rad}) = 0.5$	[MODE][MODE][2]("RAD" selected)	
	[cos][(] [SHIFT][π][÷]3	
	[)] [=]	0.5
tan (–35 grad)	[MODE][MODE][3]	
= -0.612800788	("GRA" selected)	
	[tan] [(–)] 35 [=]	-0.612800788
2sin45°×cos65°	[MODE][MODE][1]("DEG")	
= 0.597672477	2[sin] 45 [cos] 65 [=]	0.597672477
sin ⁻¹ 0.5 = 30	[SHIFT][sin ⁻¹] 0.5 [=]	30.
cos ⁻¹ (√2/2)	[MODE][MODE][2]("RAD")	
= 0.785398163 rad	[SHIFT][cos ⁻¹][(][√]2 [÷]2	
$=\pi/4$ rad	[)][=]	0.785398163
	$[\div][SHIFT][\pi][=]$	0.25
tan ⁻¹ 0.741	[MODE][MODE][1]("DEG")	
= 36.53844577°	[SHIFT][tan ⁻¹]0.741[=]	36.53844576
= 36°32' 18.4"	[SHIFT] [←°' "]	36°32°18.4°
If the total number of di	gits for degrees/minutes/se	econds exceed
11 digits, the higher ord	er values are given display	priority, and
any lower-order values a	re not displayed. However	, the entire
value is stored within the	e unit as a decimal value.	
2.5×(sin ⁻¹ 0.8-cos ⁻¹ 0.9)	2.5[×] [(] [SHIFT] [sin ⁻¹]0.8	
= 68°13'13.53"	[-] [SHIFT] [cos ⁻¹] 0.9 [)]	
	[=] [SHIFT] [←°' "]	68°13°13.53°

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Performing Hyperbolic and Inverse Hyperbolic Fu

Example	Operation	Display (Lower)
sinh3.6= 18.28545536	[hyp][sin] 3.6 [=]	18.28545536
cosh1.23 = 1.856761057	[hyp][cos] 1.23 [=]	1.856761057
tanh2.5= 0.986614298	[hyp][tan] 2.5 [=]	0.986614298
cosh1.5-sinh1.5	[hyp][cos] 1.5 [-][hyp]	
= 0.22313016	[sin] 1.5 [=]	0.22313016
sinh ⁻¹ 30 = 4.094622224	[hyp][SHIFT][sin ⁻¹] 30 [=]	4.094622224
cosh ⁻¹ (20/15)	[hyp][SHIFT][cos ⁻¹][(] 20	
= 0.795365461	[÷] 15 [)][=]	0.795365461
x = (tanh ⁻¹ 0.88) / 4	[hyp][SHIFT][tan ⁻¹]0.88	
= 0.343941914	[÷]4[=]	0.343941914
sinh ⁻¹ 2×cosh ⁻¹ 1.5	[hyp][SHIFT][sin ⁻¹]2[×]	
= 1.389388923	[hyp][SHIFT][cos ⁻¹]1.5[=]	1.389388923
sinh ⁻¹ (2/3)+tanh ⁻¹ (4/5)	[hyp][SHIFT][sin ⁻¹][(]2[÷]	
= 1.723757406	3[)][+][hyp][SHIFT][tan ⁻¹]	
	[(]4[÷]5[)][=]	1.723757406

Degree, Radian, Gradient Interconversion Degree, radian and gradient can be converted to each other with the use of [SHIFT][DRG>]. Once [SHIFT] [DRG>] have been keyed in, the "DRG" selection menu will be shown as follows.

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Example 2 Data: 10/20, 20/30, 20/30, 20/30, 20/30, 20/30, 40/50

Key operation: 10 [,] 20 [DT] 20 [,] 30 [SHIFT] [;] 5 [DT] 40 [,] 50 [DT]

By pressing [SHIFT] and then entering a semicolon followed by a value that represents the number of times DT] key, the

Exampl	e	Operation	Display
Temperature and length		[MODE][3][1]	0.
of a steel b	bar	("REG" then select linear regression)	
Temp	Length	[SHIFT][ScI][=] (Memory cleared)	0.
10°C	1003mm	10[/]1003[DT]	10.
15°C	1005mm	15[,]1005[DT]	15.
20°C	1010mm	20[,]1010[DT]	20.
25°C	1011mm	25[,]1011[DT]	25.
30°C	1014mm	30[,]1014[DT]	30.
Using this	table, the	[SHIFT][A][=](Constant term A)	997.4
5	formula and coefficient	[SHIFT][B][=] (Regression coefficient B)	0.56
can be ob on the coe	tained. Based efficient	[SHIFT][r][=] (Correlation coefficient <i>r</i>)	0.982607368
formula, th	ne length of	18[SHIFT][ŷ](Length at 18°C)	1007.48
the steel bar at 18°C		1000[SHIFT][\hat{x}](Temp at 1000mm)	4.642857143
and the temperature at 1000mm can be		[SHIFT][r][x ²][=] (Critical coefficient)	0.965517241
estimated. Furthermore		[(][RCL][F][–][RCL][C][×]	
the critical coefficient		$[SHIFT][\overline{x}][\times][SHIFT][\overline{y}][)][\div]$	
(<i>r</i> ²) and co	variance can	[(][RCL][C][-]1[)][=](Covariance)	35.
also be ca	lculated.		

Logarithmic regression

Logarithmic regression calculations are carried out using the following formula: $y = A + B \cdot \ln x$

Data input

Press [MODE] [3] [2] to specify logarithmic regression under "REG" mo

Press [SHIFT] [Scl] [=] to clear the statistical memories. Input data in the following format: <x data>, <y data> [DT]

• To make multiple entries of the same data, follow procedures described for linear regression. **Deleting input data**

To delete input data, follow the procedures described for linear regression.

Performing calculations

The logarithmic regression formula $y = A + B \cdot \ln x$. As x is input, $\ln(x)$ will be stored instead of x itself. Hence, we can treat the logarithmic regression formula same as the linear regression formula. Therefore, the formulas for constant term A, regression coefficient B and correlation coefficient r are identical for logarithmic and linear regression.

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Example		Operation	Display		
xi	yi	[MODE][3][2]	0.		
29	1.6	("REG" then select LOG regression)			
50	23.5	[SHIFT][ScI][=] (Memory cleared)	0.		
74	38	29[,]1.6[DT]	29.		
103	46.4	50[,]23.5[DT]	50.		
118 The logar	48.9	74[/]38[DT]	74.		
	n of the above	103[/]46.4[DT]	103.		
data, the regression		118[,]48.9[DT]	118.		
formula and correlation		[SHIFT][A][=](Constant term A)	-111.1283975		
coefficient are obtained. Furthermore, respective estimated values y and x can be obtained for		[SHIFT][B][=](Regression coefficient B)	34.02014748		
		[SHIFT][r][=](Correlation coefficient r)	0.994013946		
		80[SHIFT][ŷ](y when xi=80)	37.94879482		
xi = 80 an	$v_i = 73$ using	73[SHIFT][x](x when yi=73)	224.1541314		
the regre	ssion formula.				
A numb	A number of logarithmic regression calculation results				

differ from those produced by linear regression. Note the following:

Linear regression	Logarithmic regression
$\sum x$	$\sum \ln x$
$\sum x^2$	$\sum (\ln x)^2$
$\sum xy$	$\sum y \cdot \ln x$

Exponential regression

Exponential regression calculations are carried out using the following formula: $= A \cdot e^{B \cdot x} (\ln y = \ln A + Bx)$

Data input

Press [MODE] [3] [3] to specify exponential regression under the "REG" mode

Press [SHIFT] [ScI] [=] to clear the statistical memories. Input data in the following format: <x data>,<y data> [DT] · To make multiple entries of the same data, follow procedures described for linear regression. Deleting input data

To delete input data, follow the procedures described for linear regression. - 33 -

Performing calculations

If we assume that $\ln y = y$ and $\ln A = a'$, the exponential regression formula $y = A \cdot e^{B \cdot x}$ ($\ln y = \ln A + Bx$) becomes the linear regression formula y = a' + bx if we store ln(y)instead of y itself. Therefore, the formulas for constant term A, regression coefficient B and correlation coefficient r are identical for exponential and linear regression

Deleting input data

To delete input data, follow the procedures described for linear regression

Performing calculations If 1/x is stored instead of x itself, the inverse regression formula y = A + (B/x) becomes the linear regression formula y = a + bx. Therefore, the formulas for constant term A, regression coefficient B and correlation coefficient r are identical the power and linear regression.

A number of inverse regression calculation results differ from those produced by linear regression. Note the following:

Linear regression Inverse regression $\sum (1/x)$ Display Example Operation [MODE][3][▶][2] ("REG" then select Inv regressior [SHIFT][Scl][=] 2[,]2[DT] 3[,]3[DT] 4[,]4[DT] hrough inverse egression of the abov 5[,]5[DT] data, the regression 6[,]6[DT] ormula and correlatio [SHIFT][A][=] 7.272727272 oefficient are obtained [SHIFT][B][=] -11.28526646 urthermore, the regression formula is SHIFT][r][=] -0.950169098 sed to obtain the espective estimated 10[SHIFT][ŷ](y when .xi=10) 6.14420062 alues of v and x, when i = 10 and yi = 9. 6.533575316

9[SHIFT][x̂](x

uadratic Regression

Quadratic regression calculations are carried out using the

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```
following formula:
 v = A + Bx + Cx^2
```

```
Data input
```

Press [MODE] [3] [•] [3] to specify quadratic regression under the "REG" mode

- Press [SHIFT] [Scl] [=] to clear the statistical memories. Input data in this format: <x data>,<y data> [DT]
- To make multiple entries of the same data, follow
- procedures described for linear regression.

Deleting input data

To delete input data, follow the procedures described for linear regression.

Performing calculations

The following procedures are used to perform the various linear regression calculations. The regression formula is $y = A + Bx + Cx^2$ where A, B, C are

regression coefficients.

 $\begin{array}{l} \text{Fights for the relations} \\ C = [(n \sum x^2 - (\sum x)^2) (n \sum x^2 y - \sum x^2 \sum y) - (n \sum x^3 - \sum x^2 \sum x) (n \sum x y - \sum x \sum y)] \\ + [(n \sum x^2 - (\sum x)^2) (n \sum x^4 - (\sum x^2)^2) - (n \sum x^3 - \sum x^2 \sum x)^2] \\ \text{B} = [n \sum x y - \sum x \sum y - C - (2 \sum x)^2 - (2 \sum x^3 - \sum x^2 \sum x)] \\ + (n \sum x^2 - (\sum x)^2 - (2 \sum x)^2 - (2 \sum x^3 - \sum x^2 \sum x)] \\ + (n \sum x^2 - (\sum x)^2 - (2 \sum x)^2 - (2 \sum x^3 - \sum x^2 \sum x)] \\ + (n \sum x^2 - (2 \sum x)^2 - (2 \sum$

 $A = (\sum y - B\sum x - C\sum x^2) / n$

To read the value of $\sum x^3$, $\sum x^4$ or $\sum x^2y$, you can recall memory [RCL] M, Y and X respectively.

Example	Operation	Display
xi yi	[MODE][3][▶][3]	
29 1.6	("REG" then select Quad regression)	
50 23.5	[SHIFT][Scl][=]	0.
74 38	29[,]1.6[DT]	29.
103 46.4	50[,]23.5[DT]	50.
118 48 Through power	74[/]38[DT]	74.
regression of the above	103[/]46.4[DT]	103.
data, the regression	118[,]48[DT]	118.
formula and correlation	[SHIFT][A][=](Constant term A)	-35.59856935
coefficient are obtained. Furthermore, the	[SHIFT][B][=] (Regression coefficient B)	1.495939414
regression formula is used to obtain the respective estimated	[SHIFT][C][=] (Regression coefficient C)	-6.716296671 ⁻⁰³
values of y and x, when	16[SHIFT][ŷ](y when xi=16)	-13.38291067
xi = 16 and $yi = 20$.	20[SHIFT][x](x1 when yi=20)	47.14556728
	$[SHIFT][\hat{x}](x_2 \text{ when } yi=20)$	175.5872105

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Replacing the Battery

Dim figures on the display of the calculator indicate that battery power is low. Continued use of the calculator when the battery is low can result in improper operation. Replace the battery as soon as possible when display figures become dim.



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Logarithmic and Exponential Functions

Example	Operation	Display (Lower)
log1.23	[log] 1.23 [=]	
= 8.9905111×10 ⁻²		0.089905111
In90 = 4.49980967	[In] 90 [=]	4.49980967
log456÷ln456 = 0.434294481	[log]456÷[ln]456 [=]	0.434294481
101.23 = 16.98243652	[SHIFT][10 ^x] 1.23 [=]	16.98243652
e ^{4.5} = 90.0171313	[SHIFT][e ^x]4.5[=]	90.0171313
$10^4 \cdot e^{-4} + 1.2 \cdot 10^{2.3}$ = 422.5878667	[SHIFT][10 ^x]4[×][SHIFT][e ^x] [(–)]4[+]1.2[×][SHIFT][10 ^x]	
	2.3[=]	422.5878667
$(-3)^4 = 81$	[(][(–)] 3 [)] [x ^y] 4 [=]	81.
-3 ⁴ = -81	[(-)] 3 [x ^y] 4 [=]	-81.
5.6 ^{2.3} = 52.58143837	5.6 [x ^y] 2.3 [=]	52.58143837
⁷ √123 = 1.988647795	7 [SHIFT][[×] √] 123 [=]	1.988647795
(78-23)-12	[(]78[-]23[)][x ^y][(-)]12[=]	1.305111829 ⁻²¹
= 1.305111829×10 ⁻²¹		
$2+3\times^{3}\sqrt{64-4} = 10$	2[+]3[×]3[SHIFT][^x √]64	
	[-]4[=]	10.
2×3.4 ^(5+6.7) = 3306232	2[×]3.4[x ^y][(]5[+]6.7[)][=]	3306232.001

Example	Operation	Display
Define degree first	[MODE][MODE][1]("DEG" selected)	
Change 20 radian to	20[SHIFT][DRG>][2][=]	20 ^r
degree		1145.91559
To perform the following	10[SHIFT][DRG>][2]	
calculation :-	[+]25.5[SHIFT][DRG>][3]	
10 radians+25.5 gradients	[=]	10 ^r +25.5 ^g
The answer is expressed		595.9077951
in degree.		

D R 1 2

G

Degrees, Minutes, Seconds Calculations You can perform sexagesimal calculations using degrees (hours), minutes and seconds. And convert between sexagesimal and decimal values.

Example	Operation	Display
To express 2.258 degrees	2.258[°' "][=]	2°15°28.8
in deg/min/sec.		
To perform the calculation:	12[º' "]34[º' "]56[º' "][×]	
12°34'56"×3.45	3.45[=]	43°24°31.2

	peated (5, in this case) and the [DT] key, the a entries (for 20/30, in this case) are made <i>r</i> .
	ut data ious ways to delete value data, depending on ere it was entered.
Example 1	10 [,] 40 [DT]
	20 [,] 20 [DT]
	30 [,] 30 [DT]
	40 [,] 50
To delete 40 [,] 50, press [ON/AC]

20 [,] 20 [DT]

30 [,] 30 [DT] 40 [,] 50 [DT]

To delete 20 [,] 20 [DT], press 20 [,] 20 [SHIFT][CL]

To delete 40 [,] 50 [DT], press [SHIFT][CL]

Example 2 10 [,] 40 [DT]

Example 4 [$\sqrt{10}$ [,] 40 [DT] [√] 40 [,] 50 [DT] To delete[√]10[,]40[DT], press [v]10[=][Ans][,]40[SHIFT][CL]

Example 3

A number of exponential regression calculation results differ from those produced by linear regression. Note the

Linear	regression	Exponential regress	ion
Σy		∑lny	
Σy^2		$\sum (\ln y)^2$	
$\sum xy$		$\sum x \cdot \ln y$	
Examp	le	Operation	Display
xi	yi	[MODE][3][3]	0.
6.9	21.4	("REG" then select Exp regression)	
12.9	15.7	[SHIFT][ScI][=] (Memory cleared)	0.
19.8	12.1	6.9[,]21.4[DT]	6.9
26.7	8.5	12.9[/]15.7[DT]	12.9
35.1	5.2	19.8[/]12.1[DT]	19.8
	exponential of the above	26.7[,]8.5[DT]	26.7
data, the r		35.1[/]5.2[DT]	35.1
	nd correlation	[SHIFT][A][=](Constant term A)	30.49758742
	t are obtained.		-0.049203708
Furthermo	ore, the	(Regression coefficient B)	-0.049203700
used to ol		[SHIFT][r][=] (Correlation coefficient r)	-0.997247351
	e estimated and x, when	16[SHIFT][ŷ](y when xi=16)	13.87915739
<i>xi</i> = 16 an		20[SHIFT][x](x when yi=20)	8.574868045

Power regression

Power regression calculations are carried out using the following formula: $y = A \cdot x^{\overline{B}} (\ln y = \ln A + B \ln x)$ Data input Press [MODE] [3] [>] [1] to specify "power regression". Press [SHIFT] [Scl] [=] to clear the statistical memories. Input data in the following format: <x data>,<y data> [DT] • To make multiple entries of the same data, follow procedures described for linear regression. Deleting input data

To delete input data, follow the procedures described for linear regression

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Linear regression	Power regression	
$\sum x$	$\sum \ln x$	
$\sum x^2$	$\sum (\ln x)^2$	
$\sum y$	∑Iny	
$\sum y^2$	$\sum (\ln y)^2$	
$\sum xy$	∑Inx•Iny	
Example	Operation	Display
xi yi	[MODE][3][▶][1]	0.
28 2410	("REG" then select Pwr regression)	
30 3033	[SHIFT][Scl][=] (Memory cleared)	0.
33 3895	28[,]2410[DT]	28.
35 4491	30[/]3033[DT]	30.
38 5717 Through power	33[/]3895[DT]	33.
regression of the above	35[,]4491[DT]	35.
data, the regression	38[/15717[DT]	38.
formula and correlation		0.238801069
coefficient are obtained.		2.771866156
Furthermore, the	(Regression coefficient B)	2.771000150
regression formula is	[SHIFT][r][=]	0.998906255
used to obtain the	(Correlation coefficient r)	0.00000200
respective estimated values of y and x, when	40[SHIFT][ŷ](y when xi=40)	6587.674587
$x_i = 40$ and $y_i = 1000$.	1000[SHIFT][x](x when yi=1000)	20.26225681
ollowing formula:	culations are carried o	out using the
Press [SHIFT] [Scl] [= nput data in the follo	[2] to specify "inverse] to clear the statistical wing format: <x data="">, entries of the same</x>	memories. <y data=""> [DT]</y>

Performing calculations

If we assume that Iny = y, InA = a and In x = x, the power regression formula $y = A \cdot x^{B} (Iny = InA + BInx)$ becomes the linear regression formula y = a' + bx if we store ln(x)and $\ln(y)$ instead of x and y themselves. Therefore, the formulas for constant term A, regression coefficient B and correlation coefficient r are identical the power and linear regression.

A number of power regression calculation results differ from those produced by linear regression. Note the following:

	Input	t data in the following format: <x data="">,<y< th=""></y<></x>
	• To	make multiple entries of the same of
	l pro	cedures described for linear regression.
لاً المعام الم	wnload.	- 35 -

To replace the battery:-• Remove the screws that hold the back cover in place and then remove the back cover,

- Remove the old battery,
 Wipe off the side of the new battery with a dry, soft cloth.
- Load it into the unit with the positive(+) side facing up. Replace the battery cover and secure it in place with the screws

• Press [ON/AC] to turn power on.

Auto Power Off

Calculator power automatically turns off if you do not perform any operation for about six minutes. When this happens, press [ON/AC] to turn power back on.

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Specifications

Power supply: AG13 x 2 batteries Operating temperature: 0° ~ 40°C (32°F ~ 104°F)

Coordinate Transformation

· This scientific calculator lets you convert between rectangular coordinates and polar coordinates, i.e., P(x, y) $\leftrightarrow P(r, \theta)$

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· Calculation results are stored in variable memory E and variable memory F. Contents of variable memory E are displayed initially. To display contents of memory F, press [RCL] [F]. • With polar coordinates, θ can be calculated within a

range of −180°< θ≤180°.

(Calculated range is the same with radians or grads.)

Example	Operation	Display (Lower)
x=14 and y=20.7, what	[MODE][MODE][1]("DEG" selected)	
are r and θ°?	[Pol(]14 [/]20.7[)][=]	24.98979792(r)
	[RCL][F]	55.92839019(θ)
	[SHIFT][←°' "]	55°55°42.2(θ)
x=7.5 and y=-10, what	[MODE][MODE][2]("RAD" selected)	
are r and θ rad?	[Pol(]7.5[[,]][(-)]10[)][=]	12.5(r)
	[RCL][F]	-0.927295218(θ)
r=25 and θ = 56°, what	[MODE][MODE][1]("DEG" selected)	
are x and y?	[SHIFT][Rec(]25 [/]56[)][=]	13.97982259(x)
	[RCL][F]	20.72593931(y)
r=4.5 and =2π/3 rad,	[MODE][MODE][2]("RAD" selected)	
what are x and y?	[SHIFT][Rec(]4.5[[,]][(]2[÷]	
	3[×][SHIFT][π][)][)][=]	-2.25(x)
	[RCL][F]	3.897114317(y)

Permutation and Combination

Total number of permutations nPr = n!/(n-r)!Total number of combinations nCr = n!/(r!(n-r)!)

Example	Operation	Display (Lower)
Taking any four out of ten items and arranging them in a row, how many different arrangements are possible? 10P4 = 5040	10[SHIFT][nPr]4[=]	5040

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Statistical Calculations

This unit can be used to make statistical calculations including standard deviation in the **"SD**" mode, and regression calculation in the "REG" mode.

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Standard Deviation

In the "SD" mode, calculations including 2 types of standard deviation formulas, mean, number of data, sum of data, and sum of square can be performed.

Data input

1. Press [MODE] [2] to specify SD mode. 2. Press [SHIFT] [Scl] [=] to clear the statistical memories. 3. Input data, pressing [DT] key (= [M+]) each time a new piece of data is entered.

Example Data: 10, 20, 30

- Key operation: 10 [DT] 20 [DT] 30 [DT] • When multiples of the same data are input, two different
- entry methods are possible. **Example 1** Data: 10, 20, 20, 30
- Key operation: 10 [DT] 20 [DT] [DT] 30 [DT]
- The previously entered data is entered again each time the DT is pressed without entering data (in this case 20
- is re-entered). **Example 2** Data: 10, 20, 20, 20, 20, 20, 30 Key operation: 10 [DT] 20 [SHIFT] [;] 6 [DT] 30 [DT]

By pressing [SHIFT] and then entering a semicolon followed by value that represents the number of items the data is repeated (6, in this case) and the [DT] key, the multiple data entries (for 20, in this case) are made automatically.

Deleting input data

There are various ways to delete value data, depending on how and where it was entered.

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Example 1 40 [DT] 20 [DT] 30 [DT] 50 [DT] To delete 50, press [SHIFT] [CL]. Example 2 40 [DT] 20 [DT] 30 [DT] 50 [DT] To delete 20, press 20 [SHIFT] [CL]. Example 3 30 [DT] 50 [DT] 120 [SHIFT] [;] To delete 120 [SHIFT] [;] , press [ON/AC]. Example 4 30 [DT] 50 [DT] 120 [SHIFT] [;] 31 To delete 120 [SHIFT] [;] 31, press [AC].

Key Operations to recall regression calculation

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Key operation	Result
[SHIFT][A][=]	Constant term of regression A
[SHIFT][B][=]	Regression coefficient B
[SHIFT][C][=]	Regression coefficient C
[SHIFT][r][=]	Correlation coefficient r
$[SHIFT][\hat{x}][=]$	Estimated value of x
$[SHIFT][\hat{y}][=]$	Estimated value of y
[SHIFT][yơn]	Population standard deviation, yon
[SHIFT][y\sigman-1]	Sample standard deviation, yon-1
[SHIFT][y]	Mean, y
[SHIFT][xơn]	Population standard deviation, xon
[SHIFT][x\sigman-1]	Sample standard deviation, xon-1
[SHIFT][∏]	Mean, \overline{x}
[RCL][A]	Sum of square of data, $\sum x^2$
[RCL][B]	Sum of data, $\sum x$
[RCL][C]	Number of data, n
[RCL][D]	Sum of square of data, $\sum y^2$
[RCL][E]	Sum of data, $\sum y$

Performing calculations

[RCL][F]

The following procedures are used to perform the various linear regression calculations.

Sum of data, ∑

The regression formula is y = A + Bx. The constant term of regression A, regression coefficient B, correlation r, estimated value of x, and estimated value of y are calculated as shown below:

 $\begin{array}{l} \mathsf{A} = (\sum y - \sum x)/n \\ \mathsf{B} = (n\sum xy - \sum x\sum y) / (n\sum x^2 - (\sum x)^2) \\ r = (n\sum xy - \sum x\sum y) / \sqrt{((n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2))} \end{array}$ y = A + Bxx = (y - A) / B

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http://emailbydomain.com Auto manuals search

http://auto.somanuals.com TV manuals search

http://tv.somanuals.com