



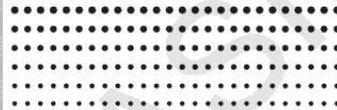
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You can read the recommendations in the user guide, the technical guide or the installation guide for CASIO FX-991ES PLUS C. You'll find the answers to all your questions on the CASIO FX-991ES PLUS C in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual CASIO FX-991ES PLUS C
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fx-115ES PLUS
fx-991ES PLUS C
User's Guide



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. 57 E-1 Important Information · The displays and illustrations (such as key markings) shown in this User's Guide 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. · In no event shall CASIO Computer Co., Ltd.

be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of the purchase or use of this product and items that come with it. Moreover, CASIO Computer Co., Ltd. shall not be liable for any claim of any kind whatsoever by any other party arising out of the use of this product and the items that come with it. · Be sure to keep all user documentation handy for future reference. Sample Operations Sample operations in this manual are indicated by a icon. Unless specifically stated, all sample operations assume that the calculator is in its initial default setup. Use the procedure under "Initializing the Calculator" to return the calculator to its initial default setup. For information about the B, b, v, and V marks that are shown in the sample operations, see "Configuring the Calculator Setup". Initializing the Calculator Perform the following procedure when you want to initialize the calculator and return the calculation mode and setup to their initial default settings.

Note that this operation also clears all data currently in calculator memory. 19(CLR)3(All)=(Yes) Safety Precautions Battery · Keep batteries out of the reach of small children. · Use only the type of battery specified for this calculator in this manual. Handling Precautions · Even if the calculator is operating normally, replace the battery at least once every three years (LR44 (GPA76)). A dead battery can leak, causing damage to and malfunction of the calculator. Never leave a dead battery in the calculator. Do not try using the calculator while the battery is completely dead. · The battery that comes with the calculator discharges slightly during shipment and storage. Because of this, it may require replacement sooner than the normal expected battery life. · Do not use an oxyride battery* or any other type of nickel-based primary battery with this product.

Incompatibility between such batteries and product specifications can result in shorter battery life and product malfunction. · Avoid use and storage of the calculator in areas subjected to temperature extremes, and large amounts of humidity and dust. · Do not subject the calculator to excessive impact, pressure, or bending. E-2 · Never try to take the calculator apart. · Use a soft, dry cloth to clean the exterior of the calculator.

· Whenever discarding the calculator or batteries, be sure to do so in accordance with the laws and regulations in your particular area. * Company and product names used in this manual may be registered trademarks or trademarks of their respective owners. Removing the Hard Case Before using the calculator, slide its hard case downwards to remove it, and then affix the hard case to the back of the calculator as shown in the illustration nearby. Turning Power On and Off Press O to turn on the calculator. Press 1A(OFF) to turn off the calculator.

Auto Power Off Your calculator will turn off automatically if you do not perform any operation for about 10 minutes. If this happens, press the O key to turn the calculator back on. Adjusting Display Contrast Display the CONTRAST screen by performing the following key operation: 1N(SETUP)c8(JCONT'). Next, use d and e to adjust contrast. After the setting is the way you want, press A. Important: If adjusting display contrast does not improve display readability, it probably means that battery power is low. Replace the battery. Key Markings Pressing the 1 or S key followed by a second key performs the alternate function of the second key. The alternate function is indicated by the text printed above the key. The following shows what the different colors of the alternate function key text mean.

If key marking text is this color: Yellow Red Purple (or enclosed in purple brackets) It means this: Press 1 and then the key to access the applicable function.

Press S and then the key to input the applicable variable, constant, or symbol. Enter the CMPLX Mode to access the function. Alternate function s Keycap function sin1 D Green (or enclosed in Enter the BASE-N Mode to access the function. green brackets) E-3 Reading the Display The display of the calculator shows expressions you input, calculation results, and various indicators. Input expression Math Indicators Math Calculation result · If a ' indicator appears on the right side of the calculation result, it means the displayed calculation result continues to the right. Use e and d to scroll the calculation result display. ·

If a g indicator appears on the right side of the input expression, it means the displayed calculation continues to the right. Use e and d to scroll the input expression display. Note that if you want to scroll the input expression while both the ' and g indicators are displayed, you will need to press A first and then use e and d to scroll.

Display indicators This indicator: Means this: The keypad has been shifted by pressing the 1 key. The keypad will unshift and this indicator will disappear when you press a key. The alpha input mode has been entered by pressing the S key. The alpha input mode will be exited and this indicator will disappear when you press a key. M STO There is a value stored in independent memory.

The calculator is standing by for input of a variable name to assign a value to the variable. This indicator appears after you press 1t(STO). The calculator is standing by for input of a variable name to recall the variable's value. This indicator appears after you press t. The calculator is in the STAT Mode.

The calculator is in the CMPLX Mode. The calculator is in the MATRIX Mode.



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The calculator is in the VECTOR Mode. The default angle unit is degrees. The default angle unit is radians. The default angle unit is grads. A fixed number of decimal places is in effect. A fixed number of significant digits is in effect. Natural Display is selected as the display format. Calculation history memory data is available and can be replayed, or there is more data above/below the current screen.

RCL STAT CMPLX MAT VCT 7 8 9 FIX SCI Math \$ `E-4 Disp The display currently shows an intermediate result of a multi-statement calculation.

Important: For some type of calculation that takes a long time to execute, the display may show only the above indicators (without any value) while it performs the calculation internally. Using Menus Some of the calculator's operations are performed using menus. Pressing N or w, for example, will display a menu of applicable functions. The following are the operations you should use to navigate between menus. · You can select a menu item by pressing the number key that corresponds to the number to its left on the menu screen. · The \$ indicator in the upper right corner of a menu means there is another menu below the current one. The ` indicator means another menu above. Use c and f to switch between menus. · To close a menu without selecting anything, press A.

Specifying the Calculation Mode When you want to perform this type of operation: General calculations Complex number calculations Statistical and regression calculations Calculations involving specific number systems (binary, octal, decimal, hexadecimal) Equation solution Matrix calculations Generate a number table based on one or two functions Vector calculations Inequality solution Verify a calculation Distribution Calculations Perform this key operation: N1(COMP) N2(CMPLX) N3(STAT) N4(BASE-N) N5(EQN) N6(MATRIX) N7(TABLE) N8(VECTOR) Nc1(INEQ) Nc2(VERIF) Nc3(DIST) Note: The initial default calculation mode is the COMP Mode. Configuring the Calculator Setup First perform the following key operation to display the setup menu: 1N(SETUP). Next, use c and f and the number keys to configure the settings you want. Underlined () settings are initial defaults. E-5 1MthIO 2LineIO Specifies the display format.

Natural Display (MthIO) causes fractions, irrational numbers, and other expressions to be displayed as they are written on paper. Math MthIO: Selects MathO or LineO. MathO displays input and calculation results using the same format as they are written on paper. LineO displays input the same way as MathO, but calculation results are displayed in linear format. Linear Display (LineIO) causes fractions and other expressions to be displayed in a single line. Note: · The calculator switches to Linear Display automatically whenever you enter the STAT, BASE-N, MATRIX, or VECTOR Mode. · In this manual, the B symbol next to a sample operation indicates Natural Display (MathO), while the b symbol indicates Linear Display. 3Deg 4Rad 5Gra Specifies degrees, radians or grads as the angle unit for value input and calculation result display. Note: In this manual, the v symbol next to a sample operation indicates degrees, while the V symbol indicates radians. 6Fix 7Sci 8Norm Specifies the number of digits for display of a calculation result. Fix: The value you specify (from 0 to 9) controls the number of decimal places for displayed calculation results. n input and then press =. Calculation Priority Sequence The priority sequence of input calculations is evaluated in accordance with the rules below. When the priority of two expressions is the same, the calculation is performed from left to right. 1st 2nd 3rd 4th Parenthetical expressions Functions that require an argument to the right and a closing parenthesis ")" following the argument.

Functions that come after the input value (x2, x3, x1, x!, ° ", °, r, g, %, 'nction and then input it. Be sure always to use the insert mode if Linear Display is selected. To clear all of the calculation you are inputting: Press A. Recurring Decimal Calculations Your calculator uses a recurring decimal when you input a value. Calculation results also can be displayed using recurring decimal form whenever applicable. Inputting a Recurring Decimal When inputting a recurrent decimal, press a!(k) before inputting its period (repetend) and then input the period up to the ending value. To input the recurring decimal 0.909090...

· (0.90), perform the following operation: "0 .a!(k) 90". Important: · If the value starts with an integer part (like: 12.3123123...), do not include the integer part when inputting the period (12.312).

· Recurring decimal input is possible only when Natural Display is selected. To input 0.33333... (0.3) B 0. Math Math a!(k) Math 3 To input 1.428571428571..

· (1.428571) B Math 1 .a!(k) Math 428571 To calculate $1.021 + 2.312$ B Math 1 .a!(k) 021e+ 2 .a!(k) 312= Calculation result displayed as recurring decimal value: Math f E-10 Note: · You can specify up to 14 decimal places for the recurring decimal period. If you input more than 14 decimal places, the value will be treated as a terminating decimal and not a recurring decimal. · Recurring decimal value input can be performed regardless of the Rdec setting on the setup menu.

Displaying a Calculation Result as a Recurring Decimal Value Calculation results that can be displayed as recurring decimal values will be displayed as such when ON is selected for the Rdec setting on the setup menu. Pressing the f key will cycle between the available calculation result formats as shown below. Fraction Recurring Decimal Decimal Value According to Display (Norm, Fix, Sci) Settings Or Decimal Value According to Display (Norm, Fix, Sci) Settings Recurring Decimal $1 \div 7 = 0.142857 = 0.1428571429$ (Norm 1) 7 1/7= Math Fraction B Math Display as recurring decimal: f Math Decimal value according to Norm 1 setting: f Math Return to initial display format (fraction): f 1 \div 7 = 1 = 0.

$142857 = 0.1428571429$ (Norm 1) 7 1/7 != B Math Math Display as fraction: f Math Display as recurring decimal: f E-11 Math Return to initial display format (Norm 1): f 1 = $0.142857 = 0.1428571429$ (Norm 1) 7 1/7= b Display as recurring decimal: f Decimal value according to Norm 1 setting: f Return to initial display format (fraction): f 1 \div 7 = 0.1428571429 (Norm 1) = 0.

$142857 = 1 \frac{1}{7}$ = b Display as fraction: f Display as recurring decimal: f Return to initial display format (Norm 1): f Conditions for Displaying a Calculation Result as a Recurring Decimal If a calculation result satisfies the following conditions, pressing f will display it as a recurring decimal value. · The total number of digits used in the mixed fraction (including integer, numerator, denominator, and separator symbol) must be no more than 10. E-12 · The data size of value to be displayed as the recurring decimal must be no larger than 99 bytes.



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Each value and the decimal point require one byte, and each digit of the period requires one byte. The following, for example, would require of total of 8 bytes (4 bytes for the values, 1 byte for the decimal point, 3 bytes for the period): 0.123 = 123 , 0.1234 = 1234 , 999 9999 B 0.12345 = 12345 99999 123 ' 999 = Math Math Math f Math 1234 ' 9999 = Math f Math 12345 ' 99999 = Math f E-13 **Toggling Calculation Results** While Natural Display is selected, each press of f will toggle the currently displayed calculation result between its fraction form and decimal form, its ' form and decimal form, or its form and decimal form.

$1 \div 6 = 1 = 0.5235987756$ 15(/)6 = B 1 6 f 0.5235987756 (' + 2) × ' = ' + 2' = 5.913591358 2 3 6 3 B (! 2 e + 2)*! 3 = ' + 2' f 6 3 5.913591358 While Linear Display is selected, each press of f will toggle the currently displayed calculation result between its decimal form and fraction form.

$1 \div 5 = 0.2 = 1 5 1/5 = 1 4 = 1 = 0.2 5 5 1-4'5 = b 0.2 f b 1\{5 1\{5 f 0.2$ Important: · Depending on the type of calculation result that is on the display when you press the f key, the conversion process may take some time to perform.

· With certain calculation results, pressing the f key will not convert the displayed value. · When ON is selected for Rdec on the setup menu, pressing f will switch the calculation result to recurring decimal form. For details, see "Recurring Decimal Calculations". · You cannot switch from decimal form to mixed fraction form if the total number of digits used in the mixed fraction (including integer, numerator, denominator, and separator symbols) is greater than 10.

Note: With Natural Display (MathO), pressing 1= instead of = after inputting a calculation will display the calculation result in decimal form. Pressing f after that will switch the calculation result to recurring decimal form, fraction form or form. The ' form of the result will not appear in this case. Basic Calculations

Fraction Calculations Note that the input method for fractions is different, depending upon whether you are using Natural Display or Linear Display. $2+1=7$ B 3 2 6 or b 2 ' 3 e + 1 ' 2 = ' 2 c 3 e + ' 1 c 2 = 2'3+1'2= 7 6 7 6 7 {6 E-14 4-3 1=1B 2 2 b 4 -1'(() 3 e 1 c 2 = 4-3'1'2= 1 2 1 {2 Note: · Mixing fractions and decimal values in a calculation while Linear Display is selected will cause the result to be displayed as a decimal value. · Fractions in calculation results are displayed after being reduced to their lowest terms.

To switch a calculation result between improper fraction and mixed fraction form: Perform the following key operation: 1f(<) To switch a calculation result between fraction and decimal form: Press f. Percent Calculations Inputting a value and pressing 1((%) causes the input value to become a percent. $150 \times 20\% = 30$ $150 * 20 1((%) = 30 75 2875 2625$ Calculate what percentage of 880 is 660. $(75\%) 660 / 880 1((%) =$ Increase 2500 by 15%. $(2875) 2500 + 2500 * 15 1((%) =$ Discount 3500 by 25%. $(2625) 3500 - 3500 * 25 1((%) =$ Degree, Minute, Second (Sexagesimal) Calculations Performing an addition or subtraction operation between sexagesimal values, or a multiplication or division operation between a sexagesimal value and a decimal value will cause the result to be displayed as a sexagesimal value. You also can convert between sexagesimal and decimal. The following is the input format for a sexagesimal value: {degrees} \$ {minutes} \$ {seconds} \$. Note: You must always input something for the degrees and minutes, even if they are zero. $2^{\circ}20'30" + 39'30" = 3^{\circ}00'00"$ $2 \$ 20 \$ 30 \$ + 0 \$ 39 \$ 30 \$ = 3^{\circ}0'0"$ Convert $2^{\circ}15'18"$ to its decimal equivalent.

$2 \$ 15 \$ 18 \$ = 2^{\circ}15'18"$ (Converts sexagesimal to decimal.) $\$ 2.255$ (Converts decimal to sexagesimal.) $\$ 2^{\circ}15'18"$ E-15 Multi-Statements You can use the colon character (:) to connect two or more expressions and execute them in sequence from left to right when you press =. $3+3:3 \times 3 3 + 3 57(:) 3 * 3 = = 6 9$

Using Engineering Notation A simple key operation transforms a displayed value to engineering notation. Transform the value 1234 to engineering notation, shifting the decimal point to the right. $1234 1234 = W 1.234 \times 10^3 W 1234 \times 10^0$ Transform the value 123 to engineering notation, shifting the decimal point to the left. $123 123 = 1W() 0.123 \times 10^3 1W() 0.$

000123×106 Calculation History In the COMP, CMPLX, or BASE-N Mode, the calculator remembers up to approximately 200 bytes of data for the newest calculation. You can scroll through calculation history contents using f and c. $1+1=2 2+2=4 3+3=6 1+1= 2+2= 3+3=$ (Scrolls back.) f (Scrolls back again.) $f 2 4 6 4 2$ Note: Calculation history data is all cleared whenever you press O, when you change to a different calculation mode, when you change the display format, or whenever you perform any reset operation. Replay While a calculation result is on the display, you can press d or e to edit the expression you used for the previous calculation. $4 \times 3 + 2.5 = 14.5$ b 4 * 3 + 2.5 = $4 \times 3 - 7.$

$1 = 4.9$ (Continuing) dYYYY- $7.1 = 14.5 4.9$ Note: If you want to edit a calculation when the ' indicator is on the right side of a calculation result display (see "Reading the Display"), press A and then use d and e to scroll the calculation. E-16 Answer Memory (Ans) /Previous Answer Memory (PreAns) The last calculation result obtained is stored in Ans (answer) memory. The calculation result obtained prior to the last one is stored in PreAns (previous answer) memory. Displaying the result of a new calculation will move current Ans memory contents to PreAns memory and store the new calculation results in Ans memory. PreAns memory can be used only in the COMP Mode. PreAns memory contents are cleared whenever the calculator enters another mode from the COMP Mode.

To divide the result of 3×4 by 30 b $3*4=$ (Continuing) / $30 = 123 + 456 = 579$ B $123 + 456 = 789 -G= 789 579 = 210$ (Continuing) For $Tk+2 = Tk+1 + Tk$ (Fibonacci sequence), determine the sequence from T1 to T5. Note however, that $T1 = 1$ and $T2 = 1$. B $T1 = 1 1 = (Ans = T1 = 1) T2 = 1 1 = (Ans = T2 = 1, PreAns = T1 = 1) T3 = T2 + T1 = 1 + 1 G+SG(PreAns) = (Ans = T3 = 2, PreAns = T2 = 1) T4 = T3 + T2 = 2 + 1 = (Ans = T4 = 3, PreAns = T3 = 2) T5 = T4 + T3 = 3 + 2$ Result: The sequence is {1, 1, 2, 3, 5}. = E-17 Variables (A, B, C, D, E, F, X, Y) Your calculator has eight preset variables named A, B, C, D, E, F, X, and Y.



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You can assign values to variables and also use the variables in calculations.

To assign the result of $3 + 5$ to variable A $3 + 5 \text{It(STO)y(A)}$ To multiply the contents of variable A by 10 (Continuing) $\text{Sy(A)} * 10 =$ To recall the contents of variable A To clear the contents of variable A (Continuing) ty(A) 8 80 8 0 0 It(STO)y(A) Independent Memory (M) You can add calculation results to or subtract results from independent memory. The "M" appears on the display when there is any value other than zero stored in independent memory. To clear the contents of M To add the result of 10×5 to M 0It(STO)l(M) (Continuing) $10 * 5 \text{10 50 15 35}$ To subtract the result of $10 + 5$ from M (Continuing) To recall the contents of M $10 + 5 \text{1l(M)}$ tl(M) (Continuing) Note: Variable M is used for independent memory. Clearing the Contents of All Memories Ans memory, independent memory, and variable contents are retained even if you press A, change the calculation mode, or turn off the calculator. PreAns memory contents are retained even if you press A and turn off the calculator without exiting the COMP Mode.

Perform the following procedure when you want to clear the contents of all memories. $\text{!9(CLR)2(Memory)=(Yes)}$ Remainder Calculations You can use the $\div R$ function in order to obtain the quotient and remainder in a division calculation. To calculate the quotient and remainder of $5 \div 2$ Math B $5 a'(\div R) 2 =$ Quotient Remainder $b 5 a'(\div R) 2 =$ Quotient Remainder E-18 Note: · Only the quotient value of a $\div R$ calculation is stored in Ans memory. · Assigning the result of a remainder division calculation to a variable will assign the quotient value only. Performing the operation $5 a'(\div R) 2 \text{!t(STO))(X)}$ (which assigns the result of $5 \div 2$ to X) will assign a value of 2 to X. · If a $\div R$ calculation is part of a multi-step calculation, only the quotient is passed on to the next operation. (Example: $10 + 17 a'(\div R) 6 = 10 + 2$) · Operation of the f and e keys is disabled while a remainder division result is on the display. Cases when Remainder Division becomes Non-remainder Division If either of the following conditions exists when you perform a remainder division operation, the calculation will be treated as normal (non-remainder) division. · When either the dividend or the divisor is a very large value Example: $20000000000 a'(\div R) 17 =$ Calculated as: $20000000000 \div 17$ · When the quotient is not a positive integer, or if the remainder is not a positive integer or positive fractional value Example: $-5 a'(\div R) 2 =$ Calculated as: $5 \div 2$ Prime Factorization In the COMP Mode, you can factor a positive integer up to 10 digits into prime factors up to three digits. To perform prime factorization on 1014 $1014 = \text{!e(FACT)}$ When you perform prime factorization on a value that includes a factor that is prime number with more than three digits, the part that cannot be factored will be enclosed in parentheses on the display.

To perform prime factorization on 4104676 ($= 22 \times 10132$) !e(FACT) Any one of the following operations will exit prime factorization result display. · Pressing !e(FACT) or $=$. · Pressing any of the following keys: \cdot or e . · Using the setup menu to change the angle unit setting (Deg, Rad, Gra) or the display digits setting (Fix, Sci, Norm). Note: · You will not be able to execute prime factorization while a decimal value, fraction, or negative value calculation result is displayed. Trying to do so will cause a math error (Math ERROR). · You will not be able to execute prime factorization while the result of a calculation that uses Pol, Rec, $\div R$ is displayed. E-19 Function Calculations For actual operations using each function, see the "Examples" section following the list below. : is displayed as 3.

141592654 , but $= 3.14159265358980$ is used for internal calculations. e : e is displayed as 2.718281828, but $e = 2.71828182845904$ is used for internal calculations.
 $\sin, \cos, \tan, \sin^{-1}, \cos^{-1}, \tan^{-1}$: Trigonometric functions. Specify the angle unit before performing calculations. See 1. $\sinh, \cosh, \tanh, \sinh^{-1}, \cosh^{-1}, \tanh^{-1}$: Hyperbolic functions. Input a function from the menu that appears when you press w.
The angle unit setting does not affect calculations. See 2. $^{\circ}, r, g$: These functions specify the angle unit. $^{\circ}$ specifies degrees, r radians, and g grads. Input a function from the menu that appears when you perform the following key operation: 1G(DRG') . See 3. $\$, \%$: Exponential functions. Note that the input method is different depending upon whether you are using Natural Display or Linear Display. See 4. \log : Logarithmic function.

Use the l key to input $\log_a b$ as $\log(a, b)$. Base 10 is the default setting if you do not input anything for a. The & key also can be used for input, but only while Natural Display is selected. In this case, you must input a value for the base. See 5. \ln : Natural logarithm to base e. See 6. $x^2, x^3, x^{\wedge}, \sqrt{\quad}, \sqrt[n]{\quad}, x^{-1}$: Powers, power roots, and reciprocals. Note that the input methods for $x^{\wedge}, \sqrt{\quad}, \sqrt[n]{\quad}$, and $^{-1}$ are different depending upon whether you are using Natural Display or Linear Display. See 7.

Note: · The following functions cannot be input in consecutive sequence: $x^2, x^3, x^{\wedge}, x^{-1}$. If you input $2ww$, for example, the final w will be ignored. 2 To input 2^2 , input $2w$, press the d key, and then press w(B). · x^2, x^3, x^{-1} can be used in complex number calculations. : Function for performing numerical integration using the Gauss-Kronrod method.

Natural Display input syntax is $b f(x)$, while Linear Display input a syntax is $(f(x), a, b, \text{tol})$. tol specifies tolerance, which becomes 1×10^5 when nothing is input for tol. Also see "Integration and Differential Calculation Precautions" and "Tips for Successful Integration Calculations" for more information. See 8. F: Function for approximation of the derivative based on the central difference method.

Natural Display input syntax is $d (f(x)$, Linear Display input syntax is $a, \text{tol})$. tol specifies tolerance, dx which becomes 1×10^{10} when nothing is input for tol. Also see "Integration and Differential Calculation Precautions" for more information. See b d dx (f(x)) $x=a$, while 9. 8: Function that, for a specified range of f(x), determines sum (f(x)) $x=a = f(a) + f(a+1) + f(a+2) + \dots + f(b)$. Natural Display input syntax is (f(x)), $x=a$ while Linear Display input syntax is (f(x), a, b). a and b are integers that b E-20 can be specified within the range of 1×10^{10} a 1×10^{10} .

See 10. Note: The following cannot be used in f(x): Pol, Rec, $\div R$. The following cannot be used in f(x), a, or b: $\cdot, d/dx, \cdot, 9$: Determines the product of f(x) over a given range. The calculation b formula is: $x=a (f(x)) = f(a) \times f(a+1) \times f(a+2) \times \dots$



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Minimum Value: $\min X^*$, $\min Y$, Maximum Value: $\max X^*$, $\max Y$ 11(STAT/DIST) 6(MinMax) 1 to 2 (When the single-variable statistical calculation is selected.) 11(STAT/DIST) 6(MinMax) 1 to 4 (When a paired-variable statistical calculation is selected.) First Quartile: Q_1 , Median: med , Third Quartile: Q_3 11(STAT/DIST) 6(MinMax) 3 to 5 (When the single-variable statistical calculation is selected.) Note: While single-variable statistical calculation is selected, you can input the functions and commands for performing normal distribution calculation from the menu that appears when you perform the following key operation: 1 1 (STAT/DIST) 5 (Distr). See "Performing Normal Distribution Calculations" for details. 2 To input the single-variable data $x = \{1, 2, 2, 3, 3, 3, 4, 4, 5\}$, using the FREQ column to specify the number of repeats for each items ($\{x_n; \text{freq}_n\} = \{1; 1, 2; 2, 3; 3, 4; 2, 5; 1\}$), and calculate the mean and population standard deviation.

IN(SETUP)c4(STAT)1(ON) STAT N3(STAT)1(1-VAR) 1 = 2 = 3 = 4 = 5 = ce 1=2=3=2= A11(STAT/DIST)4(Var)2(o)= A11(STAT/DIST)4(Var)3(x)= Results: Mean: 3 Population Standard Deviation: 1.154700538 3 To calculate the linear regression and logarithmic regression correlation coefficients for the following paired-variable data and determine the regression formula for the strongest correlation: $(x, y) = (20, 3150), (110, 7310), (200, 8800), (290, 9310)$. Specify Fix 3 (three decimal places) for results. IN(SETUP)c4(STAT)2(OFF) IN(SETUP)6(Fix)3 N3(STAT)2(A+BX) 20 = 110 = 200 = 290 = ce 3150 = 7310 = 8800 = 9310 = A11(STAT/DIST)5(Reg)3(r)= A11(STAT/DIST)1(Type)4(ln X) A11(STAT/DIST)5(Reg)3(r)= A11(STAT/DIST)5(Reg)1(A)= STAT FIX E-31 A11(STAT/DIST)5(Reg)2(B)= Results: Linear Regression Correlation Coefficient: 0.923 Logarithmic Regression Correlation Coefficient: 0.998 Logarithmic Regression Formula: $y = 3857.984 + 2357.532 \ln x$ Calculating Estimated Values Based on the regression formula obtained by paired-variable statistical calculation, the estimated value of y can be calculated for a given x -value. @@@@Specify Fix 3 for the result. @@@@ calculation result has a fractional part, it is cut off.

@@The following shows details about input and output ranges. @@The special commands are: d (decimal), h (hexadecimal), b (binary), and o (octal). To calculate $1010 + 1016 + 102 + 108$ and display the result as a decimal value Aw(DEC) 13(BASE)c1(d) 10 + 13(BASE)c2(h) 10 + 13(BASE)c3(b) 10 + 13(BASE)c4(o) 10 = 36 Converting a Calculation Result to another Type of Value You can use any one of the following key operations to convert the currently displayed calculation result to another type of value: x(DEC) (decimal), 6(HEX) (hexadecimal), l(BIN) (binary), i(OCT) (octal). To calculate 1510×3710 in the decimal mode, and then convert the result to hexadecimal, binary, and octal Ax(DEC) 15 * 37 = 555 6(HEX) 0000022B l(BIN) 0000001000101011 i(OCT) 00000001053 Logical and Negation Operations Your calculator provides you with logical operators (and, or, xor, xnor) and functions (Not, Neg) for logical and negation operations on binary values. Use the menu that appears when you press 13(BASE) to input these logical operators and functions.

All of the following examples are performed in the binary mode l(BIN). To determine the logical AND of 10102 and 11002 (10102 and 11002) A 1010 13(BASE)1(and) 1100 = 0000000000001000 To determine the logical OR of 10112 and 110102 (10112 or 110102) A 1011 13(BASE)2(or) 11010 = 00000000000011011 E-34 To determine the logical XOR of 10102 and 11002 (10102 xor 11002) A 1010 13(BASE)3(xor) 1100 = 0000000000000110 To determine the logical XNOR of 11112 and 1012 (11112 xnor 1012) A 1111 13(BASE)4(xnor) 101 = 111111111110101 To determine the bitwise complement of 10102 (Not(10102)) A13(BASE)5(Not) 1010 = 111111111110101 To negate (take the two's complement) of 1011012 (Neg(1011012)) A13(BASE)6(Neg) 101101 = 1111111111010011 Note: In the case of a negative binary, octal or hexadecimal value, the calculator converts the value to binary, takes the two's complement, and then converts back to the original number base. For decimal (base-10) values, the calculator merely adds a minus sign. Equation Calculations (EQN) You can use the following procedure in the EQN Mode to solve simultaneous linear equations with two or three unknowns, quadratic equations, and cubic equations. 1.

Press N5(EQN) to enter the EQN Mode. 2. On the menu that appears, select an equation type. To select this calculation type: Simultaneous linear equations with two unknowns Simultaneous linear equations with three unknowns Quadratic equation Cubic equation Press this key: 1($ax + by = cn$) 2($ax^2 + by^2 + cnz = dn$) 3($ax^2 + bx + c = 0$) 4($ax^3 + bx^2 + cx + d = 0$) 3. Use the Coefficient Editor that appears to input coefficient values. To solve $2x^2 + x - 3 = 0$, for example, press 3 in step 2, and then input the following for the coefficients ($a = 2, b = 1, c = -3$): 2=1=3=. To change a coefficient value you already have input, move the cursor to the appropriate cell, input the new value, and then press =. Pressing A will clear all of the coefficients to zero. Important: The following operations are not supported by the Coefficient Editor: m, 1m(M), 1t(STO). Pol, Rec, $\div R$, and multi-statements also cannot be input with the Coefficient Editor.

4. After all the values are the way you want, press =. This will display a solution. Each press of = will display another solution. Pressing = while the final solution is displayed will return to the Coefficient Editor. You can scroll between the solutions using the c and f keys. To return to the Coefficient Editor while any solution is displayed, press A. Note: Even if Natural Display is selected, the solutions of simultaneous linear equations are not displayed using any form that includes '. Values cannot be converted to engineering notation on the solution screen. E-35 A message appears to let you know when there is no solution or when there are infinite solutions.

Pressing A or = will return to the Coefficient Editor. Changing the Current Equation Type Setting Press N5(EQN) and then select an equation type from the menu that appears. Changing the equation type causes the values of all Coefficient Editor coefficients to change to zero. EQN Mode Calculation Examples $x + 2y = 3, 2x + 3y = 4$ N5(EQN)1($ax + by = cn$) 1=2=3= 2=3=4= = c Math (X=) 1 (Y=) 2 x y + z = 2, x + y z = 0, x + y + z = 4 N5(EQN)2($ax^2 + by^2 + cnz = dn$) 1 =- 1 = 1 = 2 = 1 = 1 =- 1 = 0 = -1 = 1 = 1 = 4 = = c c 2x² 3x - 6 = 0 B Math (X=) 1 (Y=) 2 (Z=) 3 3 + 57 4 3 57 c (X2=) 4 3 c (X-Value Minimum=)* 4 57 c (Y-Value Minimum=)* 8 * The local minimum value is displayed when a 0. The local maximum value is displayed when a 0. (X1=) x² 2'x + 2 = 0 B 2 N5(EQN)3($ax^2 + bx + c = 0$) 1 =- 2 ! 2) = 2 = N5(EQN)3($ax^2 + bx + c = 0$) 2 =- 3 =- 6 == (X=) ' 2 E-36 x³ 2x² x + 2 = 0 N5(EQN)4($ax^3 + bx^2 + cx + d = 0$) 1 =- 2 =- 1 = 2 == c c (X1=) 1 (X2=) 2 (X3=) 1 Matrix Calculations (MATRIX) Use the MATRIX Mode to perform calculations involving matrices of up to 3 rows by 3 columns.



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To perform a matrix calculation, you first assign data to special matrix variables (MatA, MatB, MatC), and then use the variables in the calculation as shown in the example below. $2 \ 1 \ 2 \ 1$ To assign $1 \ 1$ to MatA and $1 \ 2$ to MatB, and then perform the following calculations: $2 \ 1 \times 1 \ 1 \ 2 \ 1 + 2 \ 1$ (MatA+MatB) $1 \ 1 \ 2 \ 2$ 1 (MatA×MatB), $1 \ 2 \ 1$. Press N6(MATRIX) to enter the MATRIX Mode. 2.

Press I(MatA)5(2×2). · This will display the Matrix Editor for input of the elements of the 2×2 matrix you specified for MatA. MAT "A" stands for "MatA".
3. Input the elements of MatA: $2 \ 1 \ 1 \ 1 = 1 = 1 =$. 4. Perform the following key operation: $1 \ 4$ (MATRIX)2 (Data) 2(MatB)5(2×2). · This will display the Matrix Editor for input of the elements of the 2×2 matrix you specified for MatB. 5. Input the elements of MatB: $2 \ -1 \ -1 \ 2 =$.

6. Press A to advance to the calculation screen, and perform the first calculation (MatA×MatB): $1 \ 4$ (MATRIX)3(MatA)* $1 \ 4$ (MATRIX) 4(MatB)=. · This will display the MatAns screen with the calculation results. MAT MAT "Ans" stands for "MatAns". Note: "MatAns" stands for "Matrix Answer Memory". See "Matrix Answer Memory" for more information. 7. Perform the next calculation (MatA+MatB): $1 \ 4$ (MATRIX) 3(MatA)+ $1 \ 4$ (MATRIX)4(MatB)=. MAT MAT E-37 Matrix Answer Memory Whenever the result of a calculation executed in the MATRIX Mode is a matrix, the MatAns screen will appear with the result.
The result also will be assigned to a variable named "MatAns".

The MatAns variable can be used in calculations as described below. · To insert the MatAns variable into a calculation, perform the following key operation: $1 \ 4$ (MATRIX)6(MatAns). · Pressing any one of the following keys while the MatAns screen is displayed will switch automatically to the calculation screen: +, -, *, /, E, w, $1w(x^3)$. The calculation screen will show the MatAns variable followed by the operator or function for the key you pressed. Assigning and Editing Matrix Variable Data Important: The following operations are not supported by the Matrix Editor: m, $1m(M)$, $1t(STO)$.

Pol, Rec, $\div R$, and multi-statements also cannot be input with the Matrix Editor. To assign new data to a matrix variable: 1. Press $1 \ 4$ (MATRIX)1(Dim), and then, on the menu that appears, select the matrix variable to which you want to assign data. 2. On the next menu that appears, select dimension ($m \times n$).
3. Use the Matrix Editor that appears to input the elements of the matrix. $1 \ 0 \ 1 \ 2$ To assign $0 \ 1 \ 1$ to MatC $1 \ 4$ (MATRIX) 1(Dim)3(MatC)4(2×3) $1 = 0 \ -1 = 0 \ -1 = 0 \ -1 = 1 =$ MAT To edit the elements of a matrix variable: 1. Press $1 \ 4$ (MATRIX)2(Data), and then, on the menu that appears, select the matrix variable you want to edit. 2. Use the Matrix Editor that appears to edit the elements of the matrix. · Move the cursor to the cell that contains the element you want to change, input the new value, and then press =. To copy matrix variable (or MatAns) contents: 1. Use the Matrix Editor to display the matrix you want to copy. · If you want to copy MatA, for example, perform the following key operation: $1 \ 4$ (MATRIX)2(Data)1(MatA).

· If you want to copy MatAns contents, perform the following to display the MatAns screen: $1 \ 4$ (MATRIX)6(MatAns)=. 2. Press $1t(STO)$, and then perform one of the following key operations to specify the copy destination: -(MatA), \$(MatB), or w(MatC). · This will display the Matrix Editor with the contents of the copy destination. Matrix Calculation Examples The following examples use MatA = $1 \ 0 \ 1$ from and MatC = $0 \ 1 \ 1 \ 2$. $2 \ 1 \ 2 \ 1$ and MatB = from $1 \ 1 \ 1 \ 2 \ 1$. You can input a matrix variable into a key operation by pressing $1 \ 4$ (MATRIX) and then pressing one of the following number keys: 3(MatA), 4(MatB), 5(MatC).

E-38 $3 \ 3 \times$ MatA (Matrix scalar multiplication). $A \ 3 *MatA = 4$ Obtain the determinant of MatA (det(MatA)). $1 \ 4$ (MATRIX)7(det) MatA)= 5 Obtain the transposition of MatC (Trn(MatC)). $1 \ 4$ (MATRIX)8(Trn) MatC)= $1 \ 6$ Obtain the inverse matrix of MatA (MatA⁻¹).

Note: You cannot use 6 for this input. Use the E key to input "1". AMatA= 7 Obtain the absolute value of each element of MatB (Abs(MatB)). $1 \ 4w(Abs)$ MatB)= 8 Determine the square and cube of MatA (MatA², MatA³). Note: You cannot use 6 for this input.

Use w to specify squaring, and $1w(x^3)$ to specify cubing. AMatAw= AMatA $1w(x^3)$ = 9 Determine the MatA= row echelon form. $1 \ 4$ (MATRIX)c1(Ref) MatA)= $1 \ 0$ Determine the MatA= reduced row echelon form. $1 \ 4$ (MATRIX)c2(Rref) MatA)= Creating a Number Table from Two Functions (TABLE) TABLE generates a number table based on one or two functions. You can use the function f(x) or the two functions f(x) and g(x).

See "Configuring the Calculator Setup" for more information. Perform the following steps to generate a number table. 1. Press N7(TABLE) to enter the TABLE Mode. 2. Use the X variable to input two functions, one in the format f(x) and the other in the format g(x). E-39 · Be sure to input the X variable (S)(X)) when generating a number table. Any variable other than X is handled as a constant. · If you are using a single function, input a function in the format f(x) only. · The following cannot be used in the function: Pol, Rec, , d/dx , , .

3. In response to the prompts that appear, input the values you want to use, pressing = after each one. For this prompt: Input this: Start? End? Input the lower limit of X (Default = 1). Input the upper limit of X (Default = 5). Note: Make sure that the End value is always greater than the Start value. Input the increment step (Default = 1). Note: The Step specifies by how much the Start value should be sequentially incremented as the number table is generated. If you specify Start = 1 and Step = 1, X sequentially will be assigned the values 1, 2, 3, 4, and so on to generate the number table until the End value is reached. Step? · Inputting the Step value and pressing = generates and displays the number table in accordance with the parameters you specified. · Pressing A while the number table screen is displayed will return to the function input screen in step 2.

1 To generate a number table for the functions $f(x) = x^2 +$ and $g(x) = x^2 - 1$ for the range 1×1 , incremented in steps of 0.5 2 B N7(TABLE) $1N(SETUP)c5(TABLE)2(f(x),g(x))S(X)x+ 1 ' 2$ Math Math Math = · Pressing = without inputting anything for g(x) will generate a number table based on f(x) only. Math S)(X)x- 1 ' 2 Math = -1 =1 =0.5 = Note: · The maximum number of rows in the generated number table depends on the setup menu table setting. Up to 30 rows are supported for the "f(x)" E-40 setting, while 20 rows are supported for the "f(x),g(x)" setting.

· You can use the number table screen for viewing values only. Table contents cannot be edited.



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The number table generation operation causes the contents of variable X to be changed. Important: The function you input for number table generation is deleted whenever you display the setup menu in the TABLE Mode and switch between Natural Display and Linear Display. Vector Calculations (VECTOR)

Use the VECTOR Mode to perform 2-dimensional and 3-dimensional vector calculations.

To perform a vector calculation, you first assign data to special vector variables (VctA, VctB, VctC), and then use the variables in the calculation as shown in the example below. 1 To assign (1, 2) to VctA and (3, 4) to VctB, and then perform the following calculation: (1, 2) + (3, 4) 1. Press N8(VECTOR) to enter the VECTOR Mode. 2. Press 1(VctA)2(2). This will display the Vector Editor for input of the 2-dimensional vector for VctA. VCT "A" stands for "VctA". 3. Input the elements of VctA: 1 = 2 =. 4.

Perform the following key operation: 1 5 (VECTOR)2 (Data) 2(VctB)2(2). This will display the Vector Editor for input of the 2-dimensional vector for VctB. 5. Input the elements of VctB: 3 = 4 =. 6. Press A to advance to the calculation screen, and perform the calculation (VctA + VctB): 1 5 (VECTOR)3 (VctA)+ 1 5 (VECTOR) 4(VctB)=. This will display the VctAns screen with the calculation results. VCT VCT "Ans" stands for "VctAns". Note: "VctAns" stands for "Vector Answer Memory". See "Vector Answer Memory" for more information.

Vector Answer Memory Whenever the result of a calculation executed in the VECTOR Mode is a vector, the VctAns screen will appear with the result. The result also will be assigned to a variable named "VctAns". The VctAns variable can be used in calculations as described below. To insert the VctAns variable into a calculation, perform the following key operation: 15(VECTOR)6(VctAns). Pressing any one of the following keys while the VctAns screen is displayed will switch automatically to the calculation screen: +, -, *, /.

The calculation screen will show the VctAns variable followed by the operator for the key you pressed. E-41 Assigning and Editing Vector Variable Data Important: The following operations are not supported by the Vector Editor: m, 1m(M), 1t(STO). Pol, Rec, ÷R, and multi-statements also cannot be input with the Vector Editor. To assign new data to a vector variable: 1. Press 15(VECTOR)1(Dim), and then, on the menu that appears, select the vector variable to which you want to assign data.

2. On the next menu that appears, select dimension (m). 3. Use the Vector Editor that appears to input the elements of the vector. 2 To assign (2, 1, 2) to VctC 15(VECTOR)1(Dim)3(VctC)1(3) 2 = 1 = 2 = VCT To edit the elements of a vector variable: 1. Press 15(VECTOR)2(Data), and then, on the menu that appears, select the vector variable you want to edit. 2. Use the Vector Editor that appears to edit the elements of the vector. Move the cursor to the cell that contains the element you want to change, input the new value, and then press =. To copy vector variable (or VctAns) contents: 1.

Use the Vector Editor to display the vector you want to copy. If you want to copy VctA, for example, perform the following key operation: 15(VECTOR)2(Data)1(VctA). If you want to copy VctAns contents, perform the following to display the VctAns screen: A15(VECTOR)6(VctAns)=. 2. Press 1t(STO), and then perform one of the following key operations to specify the copy destination: -(VctA), \$(VctB), or w(VctC). This will display the Vector Editor with the contents of the copy destination. Vector Calculation Examples The following examples use VctA = (1, 2) and VctB = (3, 4) from 1, and VctC = (2, 1, 2) from 2. You can input a vector variable into a key operation by pressing 15(VECTOR) and then pressing one of the following number keys: 3(VctA), 4(VctB), 5(VctC). 3 3 × VctA (Vector scalar multiplication), 3 × VctA VctB (Calculation example using VctAns) VCT A 3 *VctA= VCT -VctB= E-42 4 VctA · VctB (Vector dot product) VCT AVctA15(VECTOR)7(Dot)VctB= 5 VctA × VctB (Vector cross product) AVctA*VctB= VCT 6 Obtain the absolute values of VctC. VCT A1w(Abs)VctC)= 7 Determine the angle formed by VctA and VctB to three decimal places (Fix 3).

v (A · B) (A · B) , which becomes = cos1) (cos = AB AB 1N(SETUP)6(Fix)3 A(VctA15(VECTOR)7(Dot)VctB)/ VCT FIX (1w(Abs)VctA)1w(Abs) VctB)= VCT FIX 1c(cos1)G)= Inequality Calculations (INEQ) You can use the following procedure to solve a quadratic inequality or cubic inequality. 1. Press Nc1(INEQ) to enter the INEQ Mode. 2. On the menu that appears, select an inequality type.

To select this inequality type: Quadratic inequality Cubic inequality Press this key: 1(aX2 + bX + c) 2(aX3 + bX2 + cX + d) 3. On the menu that appears, use keys 1 through 4 to select the inequality symbol type and orientation. 4. Use the Coefficient Editor that appears to input coefficient values. To solve x2 + 2x 3 < 0, for example, input the coefficients a = 1, b = 2, c = 3 by pressing 1 = 2 = - 3 =.

E-43 To change a coefficient value you already have input, move the cursor to the appropriate cell, input the new value, and then press =. Pressing A will clear all of the coefficients to zero. Note: The following operations are not supported by the Coefficient Editor: m, 1m(M), 1t(STO). Pol, Rec, ÷R, and multi-statements also cannot be input with the Coefficient Editor. 5. After all the values are the way you want, press =. This will display the solutions. To return to the Coefficient Editor while the solutions are displayed, press A. Note: Values cannot be converted to engineering notation on the solution screen.

Changing the Inequality Type Press Nc1(INEQ) and then select an inequality type from the menu that appears.

Changing the inequality type causes the values of all Coefficient Editor coefficients to change to zero. INEQ Mode Calculation Examples x2 + 2x 3 < 0 B Nc1(INEQ)1(aX2 + bX + c) Math 2(aX2 + bX + c < 0) Math 1 = 2 = - 3 = Math = x2 + 2x 3 0B Nc1(INEQ)1(aX2 + bX + c) 3(aX2 + bX + c 0) 1 = 2 = - 3 = = Math Math Note: Solutions are displayed as shown here when Linear Display is selected. E-44 2x3 - 3x2 0 B Nc1(INEQ)2(aX3 + bX2 + cX + d) 3(aX3 + bX2 + cX + d 0) 2 = - 3 = = Math Math 3x3 + 3x2 x 0 B Nc1(INEQ)2(aX3 + bX2 + cX + d) 1(aX3 + bX2 + cX + d 0) 3 = 3 = - 1 = = Math Math Math eee Note: Solutions are displayed as shown here when Linear Display is selected. Special Solution Display "All Real Numbers" appears on the solution screen when the solution of an inequality is all numbers. x2 0B Nc1(INEQ)1(aX2 + bX + c) 3(aX2 + bX + c 0) 1 = 0 = 0 = = Math "No-Solution" appears on the solution screen when no solution exists for an inequality (such as X2 < 0).



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Using VERIFY (VERIF) VERIFY is a function you can use to verify whether an input equality or inequality is true (indicated by TRUE) or false (indicated by FALSE). The following shows the general procedure for using VERIFY. To verify whether $4^2 = 12$ is true 9 B Math 1. Press Nc2(VERIF) to enter the VERIFY Mode. E-45 2.

Input $4^2 = 12$. 9 4 ! 9 e 1 6 (VERIFY) 1 (=) 12 · You can select the equality symbol or inequality symbol from the menu that appears when you press 16(VERIFY). 3. To verify, press =. Math You can input the following expressions for verification in the VERIFY Mode.

· Equalities or inequalities that include one relational operator $4 = 16$, $4 < 3$, $3 > 1 + 2$, $5 < (3 \times 6)$, $(2 + 6) \times 2$, etc. · Equalities or inequalities that include multiple relational operators $1 < 1 + 1$, $3 < 4$, $22 = 2 + 2 = 4$, $2 + 2 = 4 < 6$, $2 + 3 = 5 < 2 + 5 = 8$, etc. Note: · The verification result will cause 1 to be assigned to Ans memory when TRUE and 0 when FALSE. · The input expression can be a total of 99 bytes, including the left side, right side, and relational operators. ·

Any variable (A, B, C, D, E, F, X, Y, M) input into an expression is treated as a value, using the value currently assigned to the variable.

· ÷R, Pol and Rec functions cannot be used in an expression. In the VERIFY Mode, the calculator performs a mathematical operation on the input expression and then displays TRUE or FALSE based on the result. Because of this, calculation error can occur or a mathematically correct result may not be able to be displayed when the input calculation expression includes calculation that approaches the singular point or inflection point of a function, or when the input expression contains multiple calculation operations. Expression Input Precautions The following types of expressions cause a Syntax ERROR and cannot be verified. · An expression with nothing on the left side or right side (Example: $= 5^7$) 7 · An expression in which a relational operator is inside of a fraction or function (Example: $1 = 1$, $\cos(8/9)$) 2 · An expression in which a relational operator is enclosed in parentheses (Example: $8(9/10)$) · An expression in which multiple relational operators that are not oriented in the same direction (Example: $5 < 6 > 4$) · An expression that contains two of the following operators in any combination (Example: $4 < 6 > 8$) · An expression that contains consecutive relational operators (Example: $5 > 9$) E-46 VERIFY Mode Calculation Examples To verify $\log_2 \log_3 \log_4 12$) 16 (VERIFY) 4 () 1 3) 16 (VERIFY) 4 () 1 4) = To verify $0(8) 8 9 9 2 B 0 16 (VERIFY) 4 () 8 ' 9 ew- 8 ' 9 =$ To verify $52 = 25 = 625 B 5 w 16 (VERIFY) 1 (=) 25 16 (VERIFY) 1 (=) ! 625 =$ Distribution Calculations (DIST) You can use the procedures below to perform seven different types of distribution calculations. 1. Press Nc3(DIST) to enter the DIST Mode. 2. On the menu that appears, select a distribution calculation type. To select this type of calculation: Normal probability density Normal cumulative distribution Inverse normal cumulative distribution Binomial probability Binomial cumulative distribution Poisson probability Poisson cumulative distribution Press this key: 1(Normal PD) 2(Normal CD) 3(Inverse Normal) 4(Binomial PD) c1(Binomial CD) c2(Poisson PD) c3(Poisson CD) 3.

Input values for the variables. · With Binomial PD, Binomial CD, Poisson PD, and Poisson CD, you can input sample data and then perform calculations. 4. After inputting values for all of the variables, press =. · This displays the calculation results. · Pressing = or A while a calculation result is displayed will return to the input screen of the first variable Note: · To change the distribution calculation type after you enter the DIST Mode, press !1(STAT/DIST)1(Type) and then select the distribution type you want. · Distribution calculation accuracy is up to five significant digits. E-47 Variables that Accept Input The following are distribution calculation variables that accept input values. Normal PD ..

.....

.....

.....

..... x, , Normal CD

.....

.....

.....

.. Lower, Upper, , Inverse Normal

.....

.....

.. Area, , (Tail setting always left.) Binomial PD, Binomial CD ... x (or List), N, p Poisson PD, Poisson CD

· x (or List), x: data, : standard deviation (0), : mean, Lower: lower boundary, Upper: upper boundary, Tail: probability value tail specification, Area: probability value (0 Area 1), List: sample data list, N: number of trials, p: success probability (0 p 1) List Screen (Binomial PD, Binomial CD, Poisson PD, Poisson CD) With Binomial PD, Binomial CD, Poisson PD, and Poisson CD, use the List Screen for sample data input. You can input up to 25 data samples for each variable. Calculation results are also displayed on the List Screen. Distribution calculation type Value at current cursor position X: Sample data Ans: Calculation results To edit sample data: Move the cursor to the cell that contains the sample data you want to edit, input the new sample data, and then press =. To delete sample data: Move the cursor to the sample data you want to delete and then press D. To insert sample data: Move the cursor to the position where you want to insert the sample data, press !1(STAT/DIST)2(Edit)1(Ins), and then input the sample data. To delete all sample data: Press !1(STAT/DIST)2(Edit)2(Del-A). DIST Mode Calculation Examples To calculate the normal probability density when $x = 36$, $= 2$, Nc3(DIST) = 35 1(Normal PD) $36 = 2 = E-48 35 =$ Result: 0.1760326634 · Pressing = or A returns to the x input screen.

To calculate binomial probability for the sample data {10, 11, 12, 13, 14} when $N=15$ and $p=0.6$ Nc3(DIST)4(Binomial PD) Display the List Screen: 1(List) · To specify data using parameter format, press 2(Var). $10 = 11 = 12 = 13 = 14 = = 15 = 0.6 =$ ecccc Results: $x =$ binomial probability of 10 0.18594 $x =$ binomial probability of 11 0.

12678 $x =$ binomial probability of 12 0.063388 $x =$ binomial probability of 13 0.021942 $x =$ binomial probability of 14 4.7018 $\times 10^{-3}$ · Pressing = returns to the N input screen. Pressing A returns to the List Screen (input data samples are stored).

Note · The following cannot be used in the distribution calculations: Pol, Rec, ÷R, , d/dx. · When data is specified using parameter format, calculation results are stored in Ans memory. · An error message appears if the input value is outside the allowable range. "ERROR" will appear in the E-49 Ans column of the List Screen when the value input for the corresponding sample data is outside the allowable range. Scientific Constants Your calculator comes with 40 built-in scientific constants that can be used in any mode besides BASE-N. Each scientific constant is displayed as a unique symbol (such as), which can be used inside of calculations. To input a scientific constant into a calculation, press 17(CONST) and then input the two-digit number that corresponds to the constant you want.



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