anko

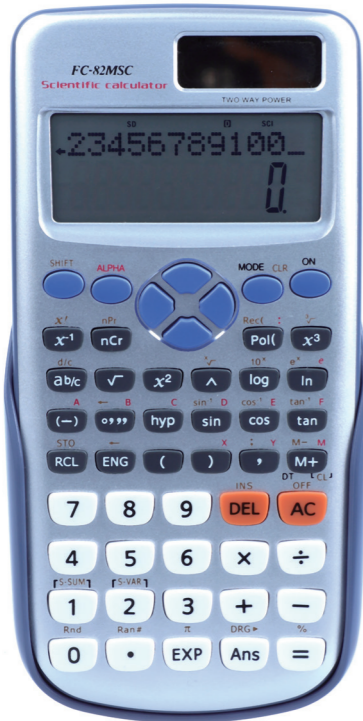# Scientific Calculator
Instruction Manual

K: 43-402-724 | T: 69-387-746
Model No.: JLR-78422

Please read all the information carefully before you use the product and keep the manual for future reference.

Safety Instructions:
Please read the instruction manual before using this device and follow all the safety instruction to avoid damage caused by improper use.

• Keep the instruction manual for future reference. Should this device be given to a third party, then this instruction manual must also be handed over.
• Use this device solely for its intended purpose.
• Keep the appliance away from all hot surfaces and naked flames.
• Always put the appliance on a level, stable, clean, dry surface. Protect the appliance from extreme heat and cold, dust, direct sunlight, humidity and drops or jets of water.
• Do not immerse the appliance in water or in other liquids.
• Do not open the housing under any circumstances.

1. Important Information

• The displays and illustrations (such as key markings) shown in this User's Guide are for illustrative purposes only.

• The contents of this manual are subject to change without notice.

• Be sure to keep all user documentation handy for future reference.

2. 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 "3. Initializing the Calculator" to return the calculator to its initial default setup.

3. Initialising 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.

4. 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.

5. Handling Precautions

This calculator are dual-powered by button cell battery and solar, to guarantee consistent performance in any setting.

• **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 becomes dim. Even if the calculator is operating normally, replace the battery at least once every two years .**
A dead battery can leak, causing damage to and malfunction of the calculator. Never leave a dead battery in the calculator.
• **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.
• 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.

6. 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.
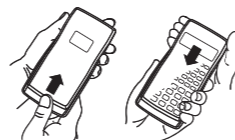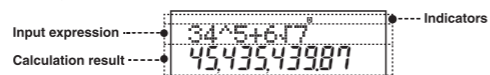

7. Turning Power On and Off

Press [ON] to turn on the calculator.
First press [SHIFT] then [AC] 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.

8. Reading the Display

The display of the calculator shows expressions you input, calculation results, and various indicators.

9. Specifying the Calculation Mode

When you want to perform this type of operation:	Perform this key operation:
General calculations	[MODE] [1] (COMP)
Standard deviation	[MODE] [2] (SD)
Regression calculations	[MODE] [3] (REG)

Note: • The initial default calculation mode is the COMP Mode. • Mode indicators appear in the upper part of the display. Be sure to check the current calculation mode (COMP, SD, REG) and angle unit setting (Deg, Rad, Gra) before beginning a calculation.

10. Configuring the Calculator Setup

Pressing the [MODE] key more than once displays additional setup screens. Underlined (___) settings are initial defaults.

[1]**Deg** [2]**Rad** [3]**Gra** Specifies degrees, radians or grads as the angle unit for value input and calculation result display.

Deg	Rad	Gra
1	2	3

Note: In this manual, the **Deg** symbol next to a sample operation indicates degrees.

[1]**Fix** [2]**Sci** [3]**Norm** Specifies the number of digits for display of a calculation result.

Fix	Sci	Norm
1	2	3

Fix: The value you specify (from 0 to 9) controls the number of decimal places for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.
Example: 100 ÷ 7 = 14.286   (Fix 3)
Sci: The value you specify (from 1 to 10) controls the number of significant digits for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.
Example: $1 \div 7 = 1.4286 \times 10^{-1}$ (Sci 5)
Norm: Selecting one of the two available settings (**Norm 1**, Norm 2) determines the range in which results will be displayed in non-exponential format. Outside the specified range, results are displayed using exponential format.
Norm 1: $10^{-2} > |x|, |x| \geq 10^{10}$ Norm 2: $10^{-9} > |x|, |x| \geq 10^{10}$
Example: $1 \div 200 = 5 \times 10^{-3}$ (Norm 1); 0.005 (Norm 2)

Disp	[1]	ab/c	d/c	▶	Dot	Comma
1		1	2		1	2

[1]**ab/c** [2]**d/c** Specifies either mixed fraction (ab/c) or improper fraction (d/c) for display of fractions in calculation results.
[1]**Dot** [2]**Comma** Specifies whether to display a dot or a comma for the calculation result decimal point. A dot is always displayed during input.

■ Initialising Calculator Settings

Perform the following procedure to initialize the calculator, which returns the calculation mode to COMP and returns all other settings, including setup menu settings, to their initial defaults.
[ON] [SHIFT] [MODE] (CLR) [2] (Mode) [=]

11. Inputting Expressions and Values

✐ 4 × sin30 × (30 + 10 × 3) = 120   **Deg**
4 [×] [sin] 30 [×] [(] 30 [+] 10 [×] 3 [)] [=]

4×sin30×(30	
	120.

Note: • The memory area used for calculation input can hold 79 "steps". One step is taken up each time you press a number key or arithmetic operator key ([+], [−], [×], [÷]). A [SHIFT] or [ALPHA] key operation does not take up a step, so inputting [SHIFT] [x²] (³√), for example, takes up only one step.
• Whenever you input the 73rd step of any calculation, the cursor changes from "_" to "■" to let you know memory is running low.

■ Calculation Priority Sequence

When the priority of two expressions is the same, the calculation is performed from left to right.

1st	Function with parentheses: Pol(x, y), Rec(r, θ),
2nd	Type A functions: With these functions, the value is entered and then the function key is pressed. (x^3, x^2, x^{-1}, $x!$, ° ' ", $\hat{x}$, $\hat{x}_1$, $\hat{x}_2$, $\hat{y}$, °, ', 9)
3rd	Powers and roots: ^(x^y), $\sqrt[x]{}$
4th	Fractions
5th	Implied multiplication of π, e (natural logarithm base), memory name, or variable name: 2π, $3e$, $5A$, πA, etc.
6th	Type B functions: With these functions, the function key is pressed and then the value is entered. ($\sqrt{}$, $^3\sqrt{}$, log, ln, e^x, 10^x, sin, cos, tan, sin^{-1}, cos^{-1}, tan^{-1}, sinh, cosh, tanh, sinh^{-1}, cosh^{-1}, tanh^{-1}, (−))
7th	Implied multiplication of Type B functions: $2\sqrt{3}$, Alog2, etc.
8th	Permutation (nPr), combination (nCr)
9th	Multiplication, division (×, ÷)
10th	Addition, subtraction (+, −)

■ Correcting and Clearing an Expression

To delete a single character or function:
1234_ → [◄] [◄] [DEL] → 124

To insert a character or function into a calculation:
123_ → [◄] [SHIFT] [DEL] (INS) [4] → 1243
• The cursor changes from "_" to "└┘".

To clear all of the calculation you are inputting: Press [AC].

12. Basic Calculations

■ Fraction Calculations

✐ $\frac{2}{3} + \frac{1}{2} = 1\frac{1}{6}$ 2 [ab/c] 3 [+] 1 [ab/c] 2 [=]   1⌐1⌐6.

✐ $4 - 3\frac{1}{2} = \frac{1}{2}$ 4 [−] 3 [ab/c] 1 [ab/c] 2 [=]   1⌐2.

Note: • Mixing fractions and decimal values in a calculation 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 format: Press [SHIFT] [ab/c] (d/c).
To switch a calculation result between fraction and decimal format: Press [ab/c].

■ Percent Calculations

✐ 150 × 20% = 30   150 [×] 20 [SHIFT] [=] (%) [=]   **30.**

✐ Calculate what percentage of 880 is 660. (75%)
660 [÷] 880 [SHIFT] [=] (%) [=]   **75.**

✐ Increase 2500 by 15%. (2875)
2500 [+] 2500 [×] 15 [SHIFT] [=] (%) [=]   **2875.**

✐ Discount 3500 by 25%. (2625)
3500 [−] 3500 [×] 25 [SHIFT] [=] (%) [=]   **2625.**

✐ If 300 grams are added to a test sample originally weighing 500 grams, what is the percentage increase in weight? (160%)
(500+300) [÷] 500 [SHIFT] [=] (%) [=]   **160.**

✐ What is the percentage change when a value is increased from 40 to 46? (15%)
(46−40) [÷] 40 [SHIFT] [=] (%) [=]   **15.**

■ Degree, Minute, Second (Sexagesimal) Calculations

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°20′30″ + 39′30″ = 3°00′00″
2 [° ' "] 20 [° ' "] 30 [° ' "] [+] 0 [° ' "] 39 [° ' "] 30 [° ' "] [=]   **3°0′0.**

✐ Convert 2°15′18″ to its decimal equivalent.
2 [° ' "] 15 [° ' "] 18 [° ' "] [=]   **2°15°18.**
(Converts sexagesimal to decimal.) [° ' "]   **2.255**
(Converts decimal to sexagesimal.) [° ' "] (←)   **2°15°18.**

■ 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 × 3   3 [+] 3 [ALPHA] [Pol] (:) 3 [×] 3 [=]   **6.Disp**
[=]   **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.**
[ENG]   **1.234×10³**
[ENG]   **1234.×10⁰**

■ Calculation History

In the COMP Mode, the calculator remembers up to approximately 150 bytes of data for the newest calculation. You can scroll through calculation history contents using [▲] and [▼].

✐ 1 + 1 = 2   1 [+] 1 [=]   **2.**
2 + 2 = 4   2 [+] 2 [=]   **4.**
3 + 3 = 6   3 [+] 3 [=]   **6.**
(Scrolls back.) [▲]   **4.**
(Scrolls back again.) [▲]   **2.**

Note: Calculation history data is all cleared whenever you press [ON], when you change to a different calculation mode, or whenever you initialize modes and settings.

■ Replay

While a calculation result is on the display, you can press [◄] or [►] to edit the expression you used for the previous calculation.

✐ 4 × 3 + 2.5 = 14.5   4 [×] 3 [+] 2.5 [=]   **14.5**
4 × 3 − 7.1 = 4.9   (Continuing) [◄] [DEL] [DEL] [DEL] [DEL] [−] 7.1 [=]   **4.9**

■ Answer Memory (Ans)

The last calculation result obtained is stored in Ans (answer) memory. Ans memory contents are updated whenever a new calculation result is displayed.

✐ To divide the result of 3 × 4 by 30
3 [×] 4 [=]   **12.**
(Continuing) [÷] 30 [=] | Ans÷30 | **0.4** |

✐ 123 + 456 = 579   123 [+] 456 [=]   **579.**
789 − 579 = 210   (Continuing) 789 [−] [Ans] [=]   **210.**

■ 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.

✐ To assign the result of 3 + 5 to variable A
3 [+] 5 [RCL] (STO) [(−)] (A)   **8.**

✐ To multiply the contents of variable A by 10
(Continuing) [ALPHA] [(−)] (A) [×] 10 [=]   **80.**

✐ To recall the contents of variable A
(Continuing) [RCL] [(−)] (A)   **8.**

✐ To clear the contents of variable A
0 [RCL] (STO) [(−)] (A)   **0.**

■ 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
0 [SHIFT] [RCL] (STO) [M+] (M)   **0.**

✐ To add the result of 10 × 5 to M
(Continuing) 10 [×] 5 [M+]   **50.**

✐ To subtract the result of 10 + 5 from M
(Continuing) 10 [+] 5 [SHIFT] [M+] (M−)   **15.**

✐ To recall the contents of M
(Continuing) [RCL] [M+] (M)   **35.**

Note: Variable M is used for independent memory.

■ Clearing the Contents of All Memories

Independent memory and variable contents are retained even if you press [AC], change the calculation mode, or turn off the calculator. Perform the following procedure when you want to clear the contents of all memories.
[ON] [SHIFT] [MODE] (CLR) [1] (Mcl) [=]

13. Function Calculations

π: π is displayed as 3.141592654, but π = 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. The angle unit setting does not affect calculations. See ✐2.

°, ʳ, ᵍ: These functions specify the angle unit. ° specifies degrees, ʳ radians, and ᵍ grads. Input a function from the menu that appears when you perform the following key operation: [SHIFT] [Ans] (DRG▶). See ✐3.

10^x, e^x: Exponential functions. See ✐4.

log: Logarithmic function. See ✐5.

ln: Natural logarithm to base e. See ✐6.

---

260 mm

x^2, x^3, $\wedge(x^y)$, $\sqrt{}$, $\sqrt[3]{}$, $\sqrt[x]{}$, x^{-1}: Powers, power roots, and reciprocals. See ✐7.

Pol, Rec: Pol converts rectangular coordinates to polar coordinates, while Rec converts polar coordinates to rectangular coordinates. See ✐8.

Pol(x, y) = (r, θ)   Rec(r, θ) = (x, y)   Specify the angle unit before performing calculations. Calculation result θ is displayed in the range of $-180° < \theta \leq 180°$.
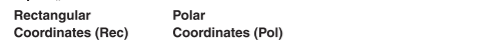
Rectangular Coordinates (Rec)   Polar Coordinates (Pol)

$x!$: Factorial function. See ✐9.

Ran#: Generates a 3-digit pseudo random number that is less than 1. See ✐10.

nPr, nCr: Permutation (nPr) and combination (nCr) functions. See ✐11.

Rnd: The argument of this function is made a decimal value and then rounded in accordance with the current number of display digits setting (Norm, Fix, or Sci). With Norm 1 or Norm 2, the argument is rounded off to 10 digits. See ✐12.

Note: Using functions can slow down a calculation, which may delay display of the result. To interrupt an ongoing calculation before its result appears, press AC.

■ Examples

| ✐1 | sin 30° = 0.5 **Deg** | sin 30 = | **0.5** |
| | sin⁻¹ 0.5 = 30° **Deg** | SHIFT sin (sin⁻¹) 0.5 = | **30.** |

| ✐2 | sinh 1 = 1.175201194 | hyp sin (sinh) 1 = | **1.175201194** |
| | cosh⁻¹ 1 = 0 | hyp SHIFT cos (cosh⁻¹) 1 = | **0.** |

✐3	$\pi/2$ radians = 90°, 50 grads = 45° **Deg**		
		(SHIFT EXP (π) ÷ 2) SHIFT Ans (DRG►) 2 (R) =	**90.**
		50 SHIFT Ans (DRG►) 3 (G) =	**45.**

| ✐4 | To calculate $e^5 \times 2$ to three significant digits (Sci 3) | | |
| | MODE •••• 2 (Sci) 3 | SHIFT ln (e^x) 5 × 2 = | **2.97×10²** |

| ✐5 | log 1000 = 3 | log 1000 = | **3.** |

| ✐6 | To calculate ln 90 (= log_e 90) to three significant digits (Sci 3) | | |
| | MODE •••• 2 (Sci) 3 | ln 90 = | **4.50×10⁰** |

✐7	1.2 × 10³ = 1200	1.2 × 10 x^y 3 =	**1200.**
	(5²)³ = 15625	(5 x^2) 2 x^y =	**15625.**
	$\sqrt[5]{32}$ = 2	5 SHIFT $\wedge$ ($\sqrt[x]{}$) 32 =	**2.**
	To calculate $\sqrt{2} \times 3$ (= $3\sqrt{2}$ = 4.242640687...) to three decimal places (Fix 3)		
	MODE •••• 1 (Fix) 3	$\sqrt{}$ 2 × 3 =	**4.243**

✐8	To convert rectangular coordinates ($\sqrt{2}$, $\sqrt{2}$) to polar coordinates **Deg**		
		Pol $\sqrt{}$ 2 , $\sqrt{}$ 2) =	$r =$**2.**
		RCL tan (F)	$\theta =$**45.**

• Press RCL cos (E) to display the value of r, or RCL tan (F) to display the value of θ.
• Press SHIFT Pol (x, r) = to display the value of r, or SHIFT tan (y, θ) = to display the value of θ.

To convert polar coordinates ($\sqrt{2}$, 45°) to rectangular coordinates **Deg**

| | SHIFT Pol (Rec( ) $\sqrt{}$ 2 , 45 = | $x =$**1.** |
| | RCL tan (F) | $y =$**1.** |

• Press RCL cos (E) to display the value of x, or RCL tan (F) to display the value of y.

| ✐9 | (5 + 3) ! = 40320 | (5 + 3) SHIFT x^{-1} ($x!$) = | **40320.** |

✐10	To obtain two random three-digit integers		
	1000 SHIFT • (Ran#) =		**459.**
	=		**48.**
	(Actual results will differ.)		

✐11	To determine the number of permutations and combinations possible when selecting four people from a group of 10		
	Permutations:	10 SHIFT ÷ (nPr) 4 =	**5040.**
	Combinations:	10 ÷ (nCr) 4 =	**210.**

✐12	To perform the following calculations when Fix 3 is selected for the number of display digits: 10 ÷ 3 × 3 and Rnd(10 ÷ 3) × 3		
	MODE •••• 1 (Fix) 3	10 ÷ 3 × 3 =	**10.000**
		10 ÷ 3 = SHIFT 0 (Rnd) × 3 =	**9.999**

14. Statistical Calculations (SD, REG*)

To select this type of statistical calculation: (Regression formula shown in parentheses)	Perform this key operation:
Single-variable (X)	MODE 2 (SD)
Paired-variable (X, Y), linear regression ($y = A + Bx$)	MODE 3 (REG) 1 (Lin)
Paired-variable (X, Y), logarithmic regression ($y = A + B\ln x$)	MODE 3 (REG) 2 (Log)
Paired-variable (X, Y), e exponential regression ($y = Ae^{Bx}$)	MODE 3 (REG) 3 (Exp)
Paired-variable (X, Y), power regression ($y = Ax^B$)	MODE 3 (REG) ► 1 (Pwr)
Paired-variable (X, Y), inverse regression ($y = A + B/x$)	MODE 3 (REG) ► 2 (Inv)
Paired-variable (X, Y), quadratic regression ($y = A + Bx + Cx^2$)	MODE 3 (REG) ► 3 (Quad)

■ Inputting Data

• In the SD Mode and REG Mode, the M+ key operates as the DT key.
• Input data using the key sequence shown below.
  SD Mode: <x-data> DT
  REG Mode: <x-data> , <y-data> DT
• DT DT inputs the same data twice.

■ Data Input Precautions

• While inputting data or after inputting data is complete, you can use the ▲ and ▼ keys to scroll through data you have input.
• Input the new value and then press the = key to replace the old value with the new one. This also means that if you want to perform some other operation, you should always press the AC key first to exit data display.
• Pressing the DT key instead of = after changing a value on the display registers the value you input as a new data item, and leaves the old value as it is.
• You can delete a data value displayed using ▲ and ▼ by pressing SHIFT M+ (CL). Deleting a data value causes all values following it to be shifted up.
• The message "Data Full" appears and you will not be able to input any more data if there is no memory left for data storage. If this happens, press the = key to display the screen shown below.
Press 2 to exit data input without registering the value you just input.
Press 1 if you want to register the value you just input. If you do this, however, you will not be able to display or edit any of the data you have input.

Ed i t OFF ESC
   1   2

• After inputting statistical data in the SD Mode or REG Mode, you will be unable to display or edit individual data items any longer after perform either the following operations: changing to another mode; changing the regression type.
• Entering the REG Mode and selecting a regression type (Lin, Log, Exp, Pwr, Inv, Quad) clear variables A through F, X, and Y.
• Do not use variables A through F, X, or Y to store data when performing statistical calculations.

■ Obtaining Statistical Values from Input Data

Supported statistical variables and the keys you should press to recall them are shown below.

For single-variable statistical calculations, the variables marked with an asterisk (*) are available.

Sum: Σx^2*, Σx*, Σy^2, Σy, Σxy, Σx^3, Σx^2y, Σx^4, **Number of Items:** n*
Σx^2, Σx, n .... SHIFT 1 (S-SUM) 1 to 3
Σy^2, Σy, Σxy .... SHIFT 1 (S-SUM) ► 1 to 3
Σx^3, Σx^2y, Σx^4 ..... SHIFT 1 (S-SUM) ► ► 1 to 3 (Quadratic Regression only)
Mean: $\bar{x}$*, $\bar{y}$, **Population Standard Deviation:** σ_x*, σ_y, **Sample Standard Deviation:** s_x*, s_y
$\bar{x}$, σ_x, s_x .... SHIFT 2 (S-VAR) 1 to 3
$\bar{y}$, σ_y, s_y .... SHIFT 2 (S-VAR) ► 1 to 3
Regression Coefficients: A, B, **Correlation Coefficient:** r
Regression Coefficients for Quadratic Regression: A, B, C
SHIFT 2 (S-VAR) ► ► 1 to 3
Estimated Values: $\hat{x}$, $\hat{y}$
Estimated Values for Quadratic Regression: $\hat{x}_1$, $\hat{x}_2$, $\hat{y}$
SHIFT 2 (S-VAR) ► ► ► 1 to 3 (or 3)
• $\hat{x}$, $\hat{x}_1$, $\hat{x}_2$ and $\hat{y}$ are not variables. They are commands of the type that take an argument immediately before them. See "Calculating Estimated Values" for more information.

✐1	To calculate the mean ($\bar{x}$) and population standard deviation (σ_x) for the following data: 55, 54, 51, 55, 53, 53, 54, 52	
	MODE 2 (SD)	
	55 DT 54 DT 51 DT 55 DT 53 DT DT 54 DT 52 DT	
	SHIFT 2 (S-VAR) 1 ($\bar{x}$) =	**53.375**
	SHIFT 2 (S-VAR) 2 (σ_x) =	**1.316956719**

✐2	To calculate the linear regression and logarithmic regression coefficients (r) 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.	
	MODE 3 (REG) 1 (Lin) MODE •••• 1 (Fix) 3	
	20 , 3150 DT 110 , 7310 DT 200 , 8800 DT 290 , 9310 DT	
	SHIFT 2 (S-VAR) ► ► 3 (r) =	**0.923**
	MODE 3 (REG) 2 (Log)	
	20 , 3150 DT 110 , 7310 DT 200 , 8800 DT 290 , 9310 DT	
	SHIFT 2 (S-VAR) ► ► 3 (r) =	**0.998**
	SHIFT 2 (S-VAR) ► ► 1 (A) =	**−3857.984**
	SHIFT 2 (S-VAR) ► ► 2 (B) =	**2357.532**

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. The corresponding x-value (two values, x_1 and x_2, in the case of quadratic regression) also can be calculated for a value of y in the regression formula.

| ✐3 | To determine the estimate value for y when $x = 160$ in the regression formula produced by logarithmic regression of the data in ✐2. Specify Fix 3 for the result. (Perform the following operation after completing the operations in ✐2.) | |
| | 160 SHIFT 2 (S-VAR) ► ► ► 2 ($\hat{y}$) = | **8106.898** |

Important: Regression coefficient, correlation coefficient, and estimated value calculations can take considerable time when there are a large number of data items.

15. Calculation Ranges, Number of Digits, and Precision

■ Calculation Range and Precision

Calculation Range: $\pm 1 \times 10^{-99}$ to $9.999999999 \times 10^{99}$ or 0
Number of Digits for Internal Calculation: 15 digits
Precision: In general, ± 1 at the 10th digit for a single calculation. Precision for exponential display is ± 1 at the least significant digit. Errors are cumulative in the case of consecutive calculations.

■ Function Calculation Input Ranges and Precision

Functions		Input Range
sin$x$ cos$x$	DEG	$0 \leq |x| < 9 \times 10^9$
	RAD	$0 \leq |x| < 157079632.7$
	GRA	$0 \leq |x| < 1 \times 10^{10}$
tan$x$	DEG	Same as sin$x$, except when $|x| = (2n-1) \times 90$.
	RAD	Same as sin$x$, except when $|x| = (2n-1) \times \pi/2$.
	GRA	Same as sin$x$, except when $|x| = (2n-1) \times 100$.
sin⁻¹x cos⁻¹x		$0 \leq |x| \leq 1$
tan⁻¹x		$0 \leq |x| \leq 9.999999999 \times 10^{99}$
sinh$x$ cosh$x$		$0 \leq |x| \leq 230.2585092$
sinh⁻¹x		$0 \leq |x| \leq 4.999999999 \times 10^{99}$
cosh⁻¹x		$1 \leq x \leq 4.999999999 \times 10^{99}$
tanh$x$		$0 \leq |x| \leq 9.999999999 \times 10^{99}$
tanh⁻¹x		$0 \leq |x| \leq 9.999999999 \times 10^{-1}$
log$x$/ln$x$		$0 < x \leq 9.999999999 \times 10^{99}$
10^x		$-9.999999999 \times 10^{99} \leq x \leq 99.99999999$
e^x		$-9.999999999 \times 10^{99} \leq x \leq 230.2585092$
$\sqrt{x}$		$0 \leq x < 1 \times 10^{100}$
x^2		$|x| < 1 \times 10^{50}$
x^{-1}		$|x| < 1 \times 10^{100}$; $x \neq 0$

$\sqrt[3]{x}$	$	x	< 1 \times 10^{100}$
$x!$	$0 \leq x \leq 69$ (x is an integer)
nPr	$0 \leq n < 1 \times 10^{10}$, $0 \leq r \leq n$ (n, r are integers) $1 \leq \{n!/(n-r)!\} < 1 \times 10^{100}$
nCr	$0 \leq n < 1 \times 10^{10}$, $0 \leq r \leq n$ (n, r are integers) $1 \leq n!/r! < 1 \times 10^{100}$ or $1 \leq n!/(n-r)! < 1 \times 10^{100}$
Pol(x, y)	$|x|$, $|y| \leq 9.999999999 \times 10^{99}$ $\sqrt{x^2 + y^2} \leq 9.999999999 \times 10^{99}$
Rec(r, θ)	$0 \leq r \leq 9.999999999 \times 10^{99}$ θ: Same as sin$x$
°'"	$	a	$, b, $c < 1 \times 10^{100}$; $0 \leq b$, c The display seconds value is subject to an error of ± 1 at the second decimal place.
←°'"	$|x| < 1 \times 10^{100}$ Decimal ↔ Sexagesimal Conversions $0°0'0'' \leq |x| \leq 9999999°59'$
x^y	$x > 0$: $-1 \times 10^{100} < y \log x < 100$ $x = 0$: $y > 0$ $x < 0$: $y = n$, $\frac{1}{2n+1}$ (n is an integer) However: $-1 \times 10^{100} < y\log	x	< 100$
$\sqrt[x]{y}$	$y > 0$: $x \neq 0$, $-1 \times 10^{100} < 1/x \log y < 100$ $y = 0$: $x > 0$ $y < 0$: $x = 2n+1$, $\frac{1}{n}$ ($n \neq 0$; n is an integer) However: $-1 \times 10^{100} < 1/x \log	y	< 100$
a^b/c	Total of integer, numerator, and denominator must be 10 digits or less (including division marks).
RanInt#(a, b)	$a < b$; $|a|$, $|b| < 1 \times 10^{10}$; $b - a < 1 \times 10^{10}$ (a, b are integers)

• Precision is basically the same as that described under "Calculation Range and Precision", above.
• Calculations that use any of the functions or settings shown below require consecutive internal calculations to be performed, which can cause accumulation of error that occurs with each calculation. x^y, $\sqrt[x]{y}$, $\sqrt[3]{}$, $x!$, nPr, nCr; °, ', ᵍ (angle unit: radians); σ_x, s_x, regression coefficient.
• Error is cumulative and tends to be large in the vicinity of a function's singular point and inflection point.
• Accumulation of errors tends to occur during statistical calculations involving data in which there is a large number of decimal places and there is little difference between data items. Input of statistical data is limited to six decimal places.

16. Error Messages

The calculator will display an error message whenever an error occurs for any reason during a calculation.

• Press ◄ or ► to return to the calculation screen. The cursor will be positioned at the location where the error occurred, ready for input. Make the necessary corrections to the calculation and execute it again.
• Press AC to return to the calculation screen. Note that this also clears the calculation that contained the error.

Math ERROR
Cause: • The intermediate or final result of the calculation you are performing exceeds the allowable calculation range. • Your input exceeds the allowable input range. • The calculation you are performing contains an illegal mathematical operation (such as division by zero).
Action: • Check the input values and reduce the number of digits. • When using independent memory or a variable as the argument of a function, make sure that the memory or variable value is within the allowable range for the function.

Stack ERROR
Cause: The calculation you are performing has caused the capacity of the numeric stack or the command stack to be exceeded.
Action: • Simplify the calculation expression. • Try splitting the calculation into two or more parts.

Syntax ERROR
Cause: There is a problem with the format of the calculation you are performing.
Action: Make necessary corrections.

Arg ERROR
Cause: Improper use of an argument.
Action: Make necessary corrections.

17. Before Assuming Malfunction of the Calculator...

Perform the following steps whenever an error occurs during a calculation or when calculation results are not what you expected. Note that you should make separate copies of important data before performing these steps.

1. Check the calculation expression to make sure that it does not contain any errors.

---

2. Make sure that you are using the correct mode for the type of calculation you are trying to perform.
3. If the above steps do not correct your problem, press the ON key.
4. Initialise all modes and settings. See "Initializing Calculator Settings".

18. Replacing the Battery

Notes: requires 1 x 1.5V L1154(LR44) battery (included).

Important: Removing the battery will cause all of the calculator's memory contents to be deleted.
1. Press SHIFT AC (OFF) to turn off the calculator.
  • To ensure that you do not accidentally turn on power while replacing the battery, slide the hard case onto the front of the calculator
2. Remove the cover as shown in the illustration and replace the battery, taking care that its plus (+) and minus (−) ends are facing correctly.
3. Replace the cover.
4. Initialize the calculator.
  • Do not skip the above step!

THIS PRODUCT CONTAINS BUTTON CELL BATTERIES. SCAN THE QR CODE FOR MORE INFORMATION.

WARNING: Button cell Batteries are Hazardous (new or used). Keep away from Children.
Button Cell Batteries can cause severe or fatal injuries in 2 hours or less if they are swallowed or placed inside any part of the body. If you suspect your child has swallowed or inserted a button cell battery, call the 24hour poisons information centre in Australia on 131126 or in New Zealand 0800 764 766 or contact your country's emergency dept.
Used batteries must be disposed of in the garbage or a battery recycle facility.

12 Month Warranty

Thank you for your purchase.

Your new product is warrantied to be free from defects in materials and workmanship for the period stated above, from the date of purchase, provided that the product is used in accordance with accompanying recommendations or instructions where provided. This warranty is in addition to your rights under the Australian Consumer Law.
For New Zealand customers, this warranty is in addition to statutory rights observed under New Zealand legislation.

We will provide you with your choice of a refund, repair (where possible) or exchange (availability dependent) for this product if it becomes defective within the warranty period. The business will bear the reasonable expense of claiming the warranty.
This warranty will no longer apply where the defect is a result of alteration, accident, misuse, abuse or neglect.

Please retain your receipt as proof of purchase and contact our Customer Service Centre as listed below, for the entity from which you purchased this item, for any difficulties with your product. Warranty claims and claims for expenses incurred in returning this product can be addressed to the respective Customer Service Centre.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Contact for Kmart purchases	Contact for Target purchases
Kmart Australia Ltd. C/- Customer Service Centre 690 Springvale Road, Mulgrave Vic 3170 Customer Service: 1800 124 125 (Australia) or 0800 945 995 (New Zealand) or via Customer Help at kmart.com.au	Target Australia Pty Ltd C/- Customer Service Centre 2 Kendall Street, Williams Landing, Vic, 3027 Customer Service: 1300 753 567 or via Customer Help at target.com.au/help/contact-us