

■ Absolute Value and Argument (Abs, arg)

You can use the following procedure to obtain the absolute value (|Z|) and argument (arg) on the Gaussian plane for a complex number of the format $Z = a + bi$.

SHIFT **hyp** (Abs); **SHIFT** **2** (CMPLX) **1** (arg)

Appendix

<#051> Obtain the absolute value and argument of $2 + 2i$.

*1 Absolute Value

*2 Argument

Statistical Calculation (STAT)

All calculations in this section are performed in the STAT Mode (**MODE** **3**).

Selecting a Statistical Calculation Type

In the STAT Mode, display the statistical calculation type selection screen.

■ Statistical Calculation Types

Key	Menu Item	Statistical Calculation
1	1-VAR	Single-variable
2	A+BX	Linear regression
3	_+CX ²	Quadratic regression
4	ln X	Logarithmic regression
5	e ^X	e exponential regression
6	A•B ^X	ab exponential regression
7	A•X ^B	Power regression
8	1/X	Inverse regression

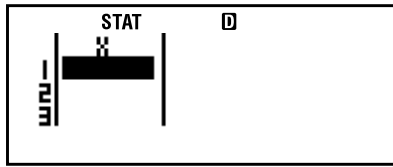
■ Inputting Sample Data

Displaying the STAT Editor Screen

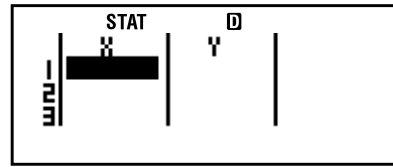
The STAT editor screen appears after you enter the STAT Mode from another mode. Use the STAT menu to select a statistical calculation type. To display the STAT editor screen from another STAT Mode screen, press **SHIFT** **1** (STAT) **2** (Data).

STAT Editor Screen

There are two STAT editor screen formats, depending on the type of statistical calculation you selected.



Single-variable Statistics



Paired-variable Statistics

- The first line of the STAT editor screen shows the value for the first sample or the values for their first pair of samples.

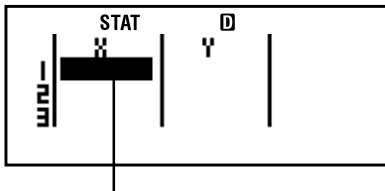
FREQ (Frequency) Column

If you turn on the Statistical Display item on the calculator's setup screen, a column labeled "FREQ" will also be included on the STAT editor screen.

You can use the FREQ column to specify the frequency (the number of times the same sample appears in the group of data) of each sample value.

Rules for Inputting Sample Data on the STAT Editor Screen

- Data you input is inserted into the cell where the cursor is located. Use the cursor keys to move the cursor between cells.

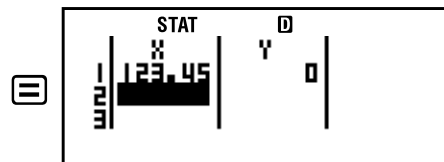
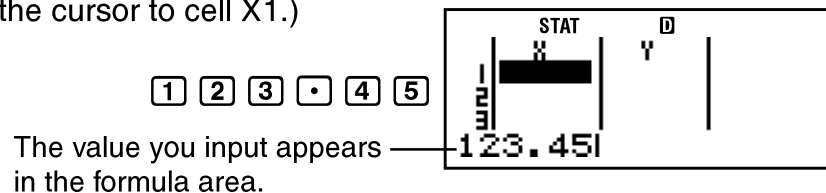


Cursor

- The values and expressions you can input on the STAT editor screen are the same as those you can input in the COMP Mode with Linear format.
- Pressing AC while inputting data clears your current input.
- After inputting a value, press = . This registers the value and displays up to six of its digits in the currently selected cell.

Example: To input the value 123.45 in cell X1

(Move the cursor to cell X1.)



Registering a value causes the cursor to move down one cell.

STAT Editor Screen Input Precautions

- The number of lines in STAT editor screen (the number of sample data values you can input) depends on the type of statistical data you selected, and on the Statistical Display setting of the calculator's setup screen.

Statistical Display Statistic Type	OFF (No FREQ column)	ON (FREQ column)
Single-variable	80 lines	40 lines
Paired-variable	40 lines	26 lines

- The following types of input are not allowed on the STAT editor screen.
 - $\boxed{M+}$, $\boxed{\text{SHIFT}} \boxed{M+}$ (M-) operations
 - Assignment to variables (STO)

Precautions Concerning Sample Data Storage

Sample data you input is deleted automatically whenever you change to another mode from the STAT Mode or change the Statistical Display setting (which causes the FREQ column to be shown or hidden) on the calculator's setup screen.

Editing Sample Data

Replacing the Data in a Cell

- (1) On the STAT editor screen, move the cursor to the cell you want to edit.
- (2) Input the new data value or expression, and then press $\boxed{\text{=}}$.

Important!

- Note that you must totally replace the existing data of the cell with new input. You cannot edit parts of the existing data.

Deleting a Line

- (1) On the STAT editor screen, move the cursor to the line you want to delete.
- (2) Press $\boxed{\text{DEL}}$.

Inserting a Line

- (1) On the STAT editor screen, move the cursor to the line that will be under the line you will insert.
- (2) Press $\boxed{\text{SHIFT}} \boxed{1}$ (STAT) $\boxed{3}$ (Edit).
- (3) Press $\boxed{1}$ (Ins).

Important!

- Note that the insert operation will not work if the maximum number of lines allowed for the STAT editor screen are already used.

Deleting All STAT Editor Contents

(1) Press **[SHIFT]** **[1]** (STAT) **[3]** (Edit).

(2) Press **[2]** (Del-A).

- This clears all of the sample data on the STAT editor screen.

Note

- Note that you can perform the procedures under “Inserting a Line” and “Deleting All STAT Editor Contents” only when the STAT editor screen is on the display.

STAT Calculation Screen

The STAT calculation screen is for performing statistical calculations with the data you input with the STAT editor screen. Pressing the **[AC]** key while the STAT editor screen is displayed switches to the STAT calculation screen.

The STAT calculation screen also uses Linear format, regardless of the current input/output format setting on the calculator’s setup screen.

Using the STAT Menu

While the STAT editor screen or STAT calculation screen is on the display, press **[SHIFT]** **[1]** (STAT) to display the STAT menu.

The content to the STAT menu depends on whether the currently selected statistical operation type uses a single variable or paired variables.

```
1:Type  2:Data
3:Edit  4:Sum
5:Var   6:MinMax
7:Distr
```

Single-variable Statistics

```
1:Type  2:Data
3:Edit  4:Sum
5:Var   6:MinMax
7:Reg
```

Paired-variable Statistics

STAT Menu Items

Common Items

Select this menu item:	When you want to do this:
[1] Type	Display the statistical calculation type selection screen
[2] Data	Display the STAT editor screen
[3] Edit	Display the Edit sub-menu for editing STAT editor screen contents
[4] Sum	Display the Sum sub-menu of commands for calculating sums
[5] Var	Display the Var sub-menu of commands for calculating the mean, standard deviation, etc.
[6] MinMax	Display the MinMax sub-menu of commands for obtaining maximum and minimum values

Commands when Linear Regression Calculation (A+BX) Is Selected

With linear regression, regression is performed in accordance with the following model equation.

$$y = A + BX$$

The following are the commands that appear on the sub-menus that appear when you select **[4]** (Sum), **[5]** (Var), **[6]** (MinMax), or **[7]** (Reg) on the STAT menu while linear regression is selected as the statistical calculation type.

See **Appendix** <#060> for information about the calculation formula used for each command.

Sum Sub-menu (**[SHIFT]** **[1]** (STAT) **[4]** (Sum))

Select this menu item:	When you want to obtain this:
[1] Σx^2	Sum of squares of the X-data
[2] Σx	Sum of the X-data
[3] Σy^2	Sum of squares of the Y-data
[4] Σy	Sum of the Y-data
[5] Σxy	Sum of products of the X-data and Y-data
[6] Σx^3	Sum of cubes of the X-data
[7] Σx^2y	Sum of (X-data squares \times Y-data)
[8] Σx^4	Sum of biquadrate of the X-data

Var Sub-menu (**[SHIFT]** **[1]** (STAT) **[5]** (Var))

Select this menu item:	When you want to obtain this:
[1] n	Number of samples
[2] \bar{x}	Mean of the X-data
[3] $x\sigma_n$	Population standard deviation of the X-data
[4] $x\sigma_{n-1}$	Sample standard deviation of the X-data
[5] \bar{y}	Mean of the Y-data
[6] $y\sigma_n$	Population standard deviation of the Y-data
[7] $y\sigma_{n-1}$	Sample standard deviation of the Y-data

MinMax Sub-menu (**[SHIFT]** **[1]** (STAT) **[6]** (MinMax))

Select this menu item:	When you want to obtain this:
[1] minX	Minimum value of the X-data
[2] maxX	Maximum value of the X-data
[3] minY	Minimum value of the Y-data
[4] maxY	Maximum value of the Y-data

Reg Sub-menu (SHIFT 1 (STAT) 7 (Reg))

Select this menu item:	When you want to obtain this:
1 A	Regression coefficient constant term A
2 B	Regression coefficient B
3 r	Correlation coefficient r
4 \hat{x}	Estimated value of x
5 \hat{y}	Estimated value of y

Appendix Linear Regression Calculation: <#061> to <#064>

- Examples <#062> through <#064> all use the data input in Example <#061>.

*1 Estimated Value ($y = -3 \rightarrow \hat{x} = ?$)

*2 Estimated Value ($x = 2 \rightarrow \hat{y} = ?$)

Commands when Quadratic Regression Calculation ($_+CX^2$) Is Selected

With quadratic regression, regression is performed in accordance with the following model equation.

$$y = A + BX + CX^2$$

See **Appendix** <#065> for information about the calculation formula used for each command.

Reg Sub-menu (SHIFT 1 (STAT) 7 (Reg))

Select this menu item:	When you want to obtain this:
1 A	Regression coefficient constant term A
2 B	Linear coefficient B of the regression coefficients
3 C	Quadratic coefficient C of the regression coefficients
4 \hat{x}_1	Estimated value of x_1
5 \hat{x}_2	Estimated value of x_2
6 \hat{y}	Estimated value of y

- Sum sub-menu (sums), Var sub-menu (number of samples, mean, standard deviation), and MinMax sub-menu (maximum value, minimum value) operations are the same those for linear regression calculations.

Appendix Quadratic Regression Calculation: <#066> to <#068>

- Examples <#066> through <#068> all use the data input in Example <#061>.

Comments for Other Types of Regression

For details about the calculation formula of the command included in each regression type, refer to the indicated calculation formulas (**Appendix** <#069> to <#073>).

Statistical Calculation Type	Model Equation	Calculation Formula
Logarithmic Regression (ln X)	$y = A + B \ln X$	<#069>
<i>e</i> Exponential Regression (e^X)	$y = Ae^{BX}$	<#070>
<i>ab</i> Exponential Regression ($A \cdot B^X$)	$y = AB^X$	<#071>
Power Regression ($A \cdot X^B$)	$y = AX^B$	<#072>
Inverse Regression (1/X)	$y = A + \frac{B}{X}$	<#073>

Appendix Comparison of Regression Curves

- The following example uses the data input in Example <#061>. <#074> Compare the correlation coefficient for logarithmic, *e* exponential, *ab* exponential, power, and inverse regression. (FREQ: OFF)

Appendix Other Types of Regression Calculation: <#075> to <#079>

Command Usage Tips

- The commands included in the Reg sub-menu can take a long time to execute in logarithmic, *e* exponential, *ab* exponential, or power regression calculation when there are a large number of data samples.

Base-*n* Calculations (BASE-N)

The BASE-N Mode lets you perform arithmetic calculations, negative value calculations, and logical operations with binary, octal, decimal, and hexadecimal values.

All calculations in this section are performed in the BASE-N Mode (**MODE** **4**).