

fx-991CW Interactive Manual

Scientific ClassWiz

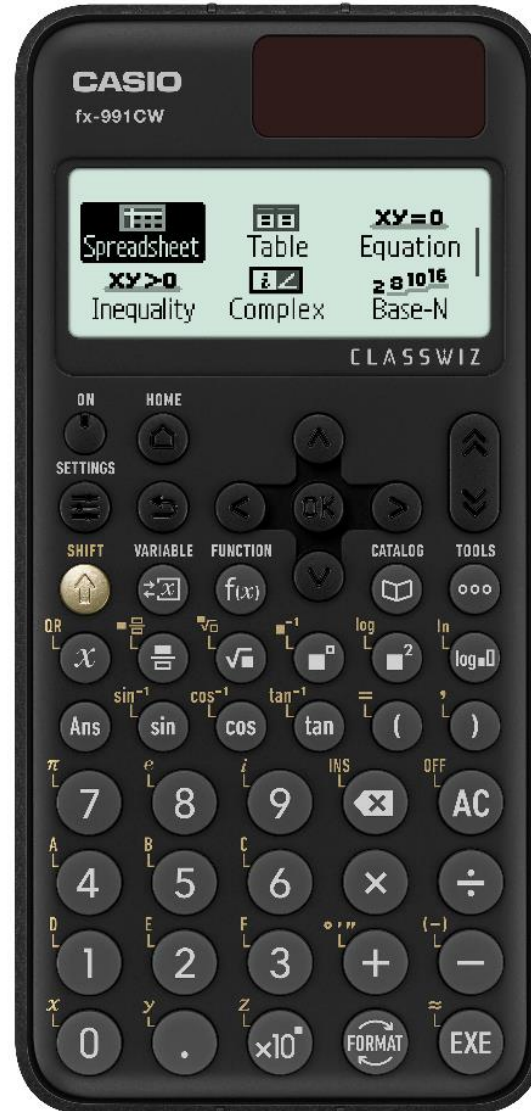
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- [Training video](#)
 - This is a recording from a live training webinar.
 - The video introduces the key features of the fx-991 CW calculator.
 - If you're new to using one of these calculators, you've come to the right place!
- ClassWiz Practice (worksheets/teaching slides)
 - [Revision Mat](#) - fx-991CW teaching resources for Higher GCSE.
 - [Cross Number Puzzles](#) - teaching resources focusing on Cross Number for fx-991CW calculator (Higher GCSE)
 - [Teaching Resources page](#) – general resources page including skills videos.

How to navigate around the manual

CASIO

- Open the slideshow
- Press any key/label on the handset to access the user guide
- Use the mini calculator icon to return to the handset



*Use the mini
calculator icon to
return*



[Online User Guide Video](#)

The most important key

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W

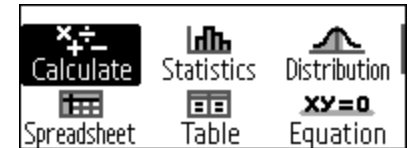
ON

Turn the handset on. Defaults to the last used application/menu screen.



Example: Always useful before attempting a calculation.

W



Notice the slight recess, so that if placed face down without the cover the handset will not turn on.

Want a decimal value for a calculation?

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Decimal Approximation

Evaluate a decimal from a calculation instead of using FORMAT.



Example: From the default settings, find the decimal value $\frac{1}{12} + \frac{1}{3}$

$$\frac{1}{12} + \frac{1}{3} \text{ qB}$$

$$\frac{1}{12} + \frac{1}{3}$$

0.4166666667

Make sure to press SHIFT first.

Using decimal approximation after calculating a value with $\frac{\square}{\square}$ performs another calculation, so be careful when using $\frac{\square}{\square}$.

Z

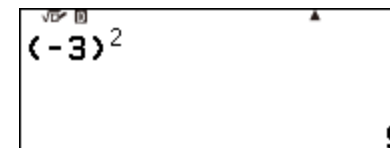
Negative

Negate a number in a calculation, list or table.



Example: Evaluate -3^2

(qp3)dB



Be careful to interpret the question correctly, this isn't the negative of three squared, hence parentheses. Notice that the screen character is shorter than subtract.

X

The default key to enter the variable x .



Example: Define $g(x) = x^2 - 2x - 3$

QRthree times | [d-2[-3|

$g(x) = x^2 - 2x - 3$

The variable x can also be entered using q0.

Reciprocal

Equivalent to “one over” your entry.



Example: (a) Take the reciprocal of the calculation 2×3^2 (b) Enter $\frac{1}{5}$

(a) $(2 \times 3^2)^{-1}$

(b) 5^{-1}

$(2 \times 3^2)^{-1}$
 $\frac{1}{18}$

5^{-1}
 $\frac{1}{5}$

Use parentheses to take the reciprocal of the whole calculation.

Remember $x^{-1} = \frac{1}{x}$.



Logarithm

Take a logarithm with a defined base.



Example: Find (a) $\log_2 64$ (b) $\log_{64} 2$

(a) $\log_2 64$

(b) $\log_{64} 2$

Calculator screen showing $\log_2(64)$ with the result 6.

Calculator screen showing $\log_{64}(2)$ with the result 1/6.

Taking logarithms is the opposite of raising something to a power.

a

Fraction template

Easily enter a fraction.



Example: Find (a) $\frac{7}{12} \div \frac{2}{3}$ (b) $\frac{1.3 \times 4.7}{3}$

(a) $\frac{7}{12} \div \frac{2}{3}$

(b) $\frac{(1.3 \times 4.7)}{3}$

$$\frac{7}{12} \div \frac{2}{3} = \frac{7}{8}$$

$$\frac{(1.3 \times 4.7)}{3} = \frac{6.11}{3} = \frac{611}{300}$$

Be careful to scroll away from the first denominator, otherwise

Use parentheses to define the numerator.

$$\frac{7}{12 \div \frac{2}{3}} = \frac{7}{18}$$

[Using FRACTIONS video](#)

S

Square Root

Find the square root of a value or a calculation.



Example: Find (a) $\sqrt{5.6}$ (b) $\sqrt{12^2 + 7^2}$

(a) s5.6B

(b) s12d+7dB

$$\sqrt{5.6}$$
$$2.\overline{3664319132}$$

$$\sqrt{12^2 + 7^2}$$
$$\sqrt{193}$$

Only the positive root is given.

Notice the surd answers, use " or n for decimal values.

F

Nth Root

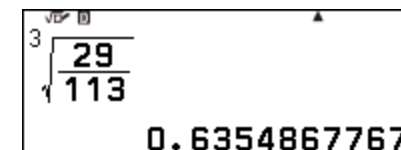
Find the nth root of a value or a calculation.



Example:

Find $\sqrt[3]{\frac{29}{113}}$

qs3\$29a113B



$\sqrt[3]{\frac{29}{113}}$
0.6354867767

Notice that n can also be negative.



Index

Enter an exponent for an expression or value.



Example: Find (a) 1.75^5 (b) $(1.6 \times 4.3)^{-3}$

(a) 1.75^5

(b) $(1.6 \times 4.3)^{-3}$

1.75^5
16.41308594

$(1.6 \times 4.3)^{-3}$
0.00307068088

*Use this key either before or after entering the base value.
Useful for entering fractional and negative exponentials.*

Why not call it timber?

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h

Natural logarithm

Evaluate a logarithm with base **e** (Euler's constant).



Example: Find $\ln 3.4$

qi3.4)B

$\ln(3.4)$
1.223775432

It's good practice to close the parentheses, but not necessary.

Why so irrational?

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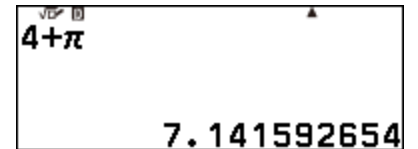
- Irrational constants**
- evaluate a logarithm with base **e** (Euler's constant).



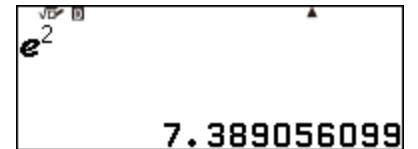
Example: Find (a) $4+\pi$ (b) e^2

(a) $4+\pi$

(b) e^2



$4+\pi$
7.141592654



e^2
7.389056099

Although irrational, both of these values are used in calculations to 22 d.p accuracy.



Hours:Minutes:Seconds

Enter decimal time and angles and convert to sexagesimal.



Example:

Express (a) 2.4 hrs as H:M:S

(b) 3hrs 54 mins 36 secs as a decimal

(a) 2.4q+B

(b) 3x54x36xqB

2.4[□]
2° 24 ' 0"

3[□] 54[□] 36[□]
3.91

Always enter a value for H:M even if it is zero.

jkl

Trigonometric ratios

Evaluate ratios for given angles.



Example: Find (a) $\sin 75$ (b) $3\cos 45$

(a) $\sin 75^\circ$

(b) $3\cos 45^\circ$

$\sin(75)$
$$\frac{\sqrt{6} + \sqrt{2}}{4}$$

$3\cos(45)$
$$\frac{3\sqrt{2}}{2}$$

It's good practice to close the parentheses, but not necessary.

For multiple calculations, it may be more useful to have decimal values, so change ↓ to MathI/DecimalO.

()

Parentheses (brackets)

Essential to ensure correct BIDMAS operation order.



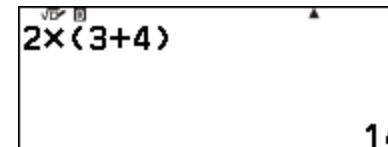
Example:

Find (a) $2 \times (3 + 4)$

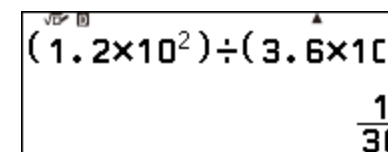
(b) $1.2 \times 10^2 \div 3.6 \times 10^3$

(a) $2 \times (3 + 4)$ B

(b) $(1.2 \times 10^2) \div (3.6 \times 10^3)$ B



2 × (3 + 4)
14



$(1.2 \times 10^2) \div (3.6 \times 10^3)$
 $\frac{1}{30}$

*The calculator follows BIDMAS strictly, so inserting parentheses is key for correct calculations.
Make sure to scroll after entering the exponent.*

Saved something for later?

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ABCDEF **Stored Variables A-F, x , y and z**

X@V Store calculations and values for later recall and manipulation.



Example: (a) Evaluate $\tan 35$ and store as B (b) Evaluate $5.2 \times \tan 35$

(a) $\tan(35)$ B $\downarrow$ twice

(b) $5.2 \times$ B

$\tan(35)$
0.7002075382

$5.2 \times$ B
3.641079199

Manipulate stored variables using normal rules of arithmetic.
Press $\downarrow$ to see the values of all stored variables.

Pause a second

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Comma

Use to separate entries.



Example: Find LCM of 27 and 15

TRR|R|27q)15)B

LCM(27, 15)
135

Can also be used when generating random numbers, GCD etc.

A

Mixed number template

Use to enter a mixed number.



Example: Enter $3\frac{1}{6}$

3qa1R6B

A diagram illustrating the conversion of a mixed number to an improper fraction. On the left, the mixed number $3\frac{1}{6}$ is shown. On the right, the equivalent improper fraction $\frac{19}{6}$ is shown. The fraction $\frac{19}{6}$ is represented with 19 in the numerator and 6 in the denominator.

Use n to change the appearance of the final value.

K

Exponent

Use when entering standard form.



Example:

Find (a) 3.65×10^4

(b) $1.2 \times 10^3 \div 2.7 \times 10^{-2} + 4$

(a) 3.65K4B

(b) a1.2K3R2.7Kqp2\$\$\$+4

3.65×10⁴
36 500

$\frac{1.2 \times 10^3}{2.7 \times 10^{-2}} + 4$
400 036
9

The fraction template avoids the need to use parentheses.

[Using STANDARD FORM video](#)



Answer memory

Recall and manipulate the previously calculated value.



Example: (a) multiply $\sin 60 + 4$ by 3.2 (b) find x_4 for the iteration $x_{n+1} = 1 + \frac{1}{x_n}$, $x_1 = 2$

(a) $\text{j60)+4B} \times 3.2\text{B}$

(b) $2\text{B}1+*/\text{Bthree times}$

Ans $\times$ 3.2
$$\frac{64+8\sqrt{3}}{5}$$

1+Ans⁻¹
$$\frac{8}{5}$$

*Notice that * doesn't actually need pressing in the first example.
A very useful method for approximating solutions to equations.*

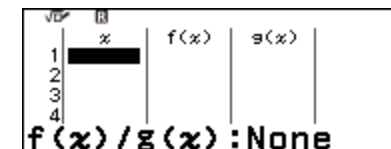
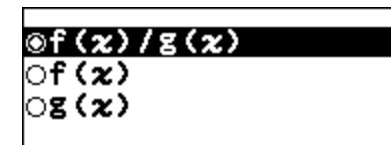
BACK

Move back or return up a menu level.



Example: Return from setting the Table Type in Table.

twice



Also useful for returning the cursor to the end of the input line after a calculation to edit or replay.
See [1](#) for how to set the Table Type.

E
!\$
R

Scroll

Navigate through menus, check calculation history and move the cursor.



Example:

(a) change 2×13 to 21×3

(b) navigate to LCM in Calculate

(a) 2×13 !o!1

(b) TRR|R|

21x3

LCM<

Press !\$ after a calculation to move the cursor to the end of the input line, to edit or replay.
Press ER to scroll through the calculation history on screen.

Are you sure?

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OK

Confirm data entry, a menu choice or perform a calculation.



Example: Find 5!

5TR|R|B

5!
120

↓ and B are interchangeable.

Let's save some key presses

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%

Page Scroll

&

Use when a scroll bar appears, to scroll a page at a time.



Example: Scroll through I to find Degrees.

T&R|

Degrees
Radians
Gradians
Rect to Polar

If there are too many menu options to fit on the screen, a scroll bar appears to the right.

q SHIFT

Use to access the modifying key labels.



Example: (a) Enter the reciprocal $\frac{1}{7}$ (b) Turn the calculator off

(a) q⁷B

(b) qC



Notice the q indicator at the top of the screen, before pressing the modified key.

If it's not constant, it's variable.

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Variable

Access and edit stored variables.



Example:

(a) Store 3.5^3 as **A**

(b) Change the value of **A** to 43

(a) '|R|3.5^3|

(b) 43B'|twice

A=42.875 B=0
C=0 D=0
E=0 F=0
X=0 Y=0
Z=0

43
43

See [Stored Variables](#).

The values are shown in Norm1 format.

[Using MEMORY video](#)

d Square

Easily square expressions and values.



Example: Find (a) 2.675^2 (b) $(3.27 + 1.49)^2$

(a) 2.675^2

(b) $(3.27+1.49)^2$

Calculator display showing 2.675^2 and the result 7.155625. The display shows the number 2.675, followed by a square button icon, and then the result 7.155625.

Calculator display showing $(3.27+1.49)^2$ and the result 23.1025. The display shows the expression (3.27+1.49), followed by a square button icon, and then the result 23.1025.

See [△](#) to enter other exponentials including negatives and fractions.

Think of a number

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123

456

789

0

Number digits

Enter numbers, obviously.



Example:

Enter 12345.6789

12345.6789B

12345.6789
12 345.6789

Notice the digit separation, change L to turn off.

Oh no, I've made a mistake

CASIO

O

Backspace

Delete entries.



Example: Enter 513 and then edit it to 523

512otwice23B



Compare with ⏮ for undoing the last key press.

C All Clear

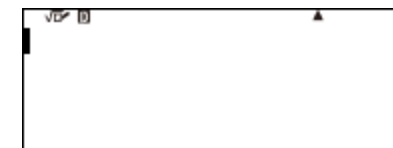
Close a selected menu or clear the screen.



Example: (a) Clear the Calculate screen (b) Close L'QTI menus

(a) C

(b) C



Calculation history is still available by pressing E. Closing a menu, returns to the previously displayed screen.
Alternatively press ` repeatedly to return back through the menus.
Also used to turn the calculator OFF.

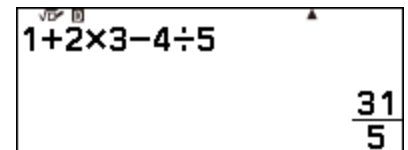
OP+p Addition, multiplication, subtraction and division.

Add, multiply, subtract and divide, obviously.



Example: Find $1 + 2 \times 3 - 4 \div 5$

$$1+2\times 3-4\div 5B$$


$$1+2\times 3-4\div 5$$
$$\frac{31}{5}$$

Notice the order of operations is not left to right, but follows BIDMAS.

Decimal point.

- For when you absolutely must utilise all of the decimal number system.



Example: Find $\frac{3}{7} + 3.7$

3a7\$+3.7B

$$\frac{3}{7} + 3.7 = \frac{289}{70}$$

Change L for a comma decimal mark.

If you want something done ...

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B Execute

Perform calculations or confirm data entry.



Example: Find (a) $\sqrt[3]{27 \times 10^3}$ (b) $\log 512$

(a) `qs3$27K3B`

(b) `T|R|512)B`

$\sqrt[3]{27 \times 10^3}$
30

$\log(512)$
2.709269961

See `|` as they are interchangeable with each other.
See also `|`.



Quick Read

Create a QR code from a calculation or Table.



Example: (a) Create a QR code from $\sqrt{25.9}$ (b) Create a QR code from a Table of $f(x) = x^2$ $1 \leq x \leq 5$

(a) s25.9Bq[

(b) IR|twice[d|I|Rthree times|q[



*Scan the QR code on the calculator screen with a smart device. This can then take you to ClassPad.net.
Click the QR codes above to simulate scanning.*

What's the inverse?

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< Inverse trigonometric function

> Find an angle from a value.
?



Example: Find (a) $\sin^{-1} 0.75$ (b) $\tan^{-1} -35$

(a) `sj0.75)B`

(b) `qlqp35)B`

`sin-1(0.75)`
48.59037789

`tan-1(-35)`
-88.36342296

Notice that only a single value is given, in the range $-90^\circ \leq x \leq 90^\circ$.

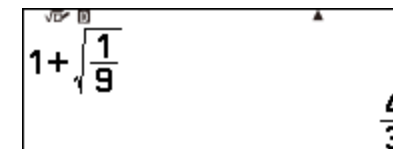
INS Insert

Edit calculations using existing arguments.



Example: Edit $1 + \frac{1}{9}$ to $1 + \sqrt{\frac{1}{9}}$

1+1a9!twiceqosB



$1 + \sqrt{\frac{1}{9}}$ $\frac{4}{3}$

Notice the **INS** cursor changes to ►.
This saves deleting and re-entering parts of the calculation.

This is the end

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OFF Off
When you have had enough ...



Example: Turn the calculator off

qC

That's all folks ...



Function

Define and evaluate 2 functions and use in calculations.



Example: (a) Define $f(x) = x^2 - 2x - 3$ and $g(x) = f(2x) + 4$ (b) Evaluate $4g(2)$

(a) QRtwice|[d-2[-3|
QRthree times|Q|2|)+4|
(b) 4QR|2)B

g(x)=f(2x)+4

4g(2)
36

Compare to using [|](#) for defining functions in Table.

[Using FUNCTION video](#)

n

Format

Display the most appropriate value format.



Example: Enter (a) $\frac{17}{12}$ (b) 32292 then press n and choose a format.

	Standard Decimal Improper Fraction Mixed Fraction	Standard Decimal Improper Fraction Mixed Fraction	Improper Fraction Mixed Fraction ENG Notation Sexagesimal		Standard Decimal Prime Factor ENG Notation
	↓	↓	↓		↓

Use n to swap between different representations of the same value, the default is Standard.

Notice how the menu changes depending on the input.

Useful for individual calculations, change L to always get decimals or mixed fractions. [Using FORMAT video](#)

C

Log

Enter logarithm calculations with base 10.



Example:

(a) Enter $\log 10000$

(b) Find $\frac{d(\log x^2)}{dx} x = 4$

(a) `qd10000)B`

(b) `T|twiceqd[d)$4B`

$\log(10000)$
4

$\frac{d}{dx}(\log(x^2))|_{x=4}$
0.217147241

See also [i](#) and [h](#).



Equals

Use with Solver in Equation or in Spreadsheet.



Example:

(a) Solve $7x - 3 = 5$

(b) Enter **B1**=sin(A1)

(a) 7[-3q(5|R|

(b) q(jq41)|

7x-3=5
x= 1.142857143
L-R= 0

	A	B	C	D
1	45	0.7071		
2				
3				
4				

Note that I can also be used to enter = in Solver.

U Imaginary unit

Use with Complex number calculations.



Example: (a) Find $(2 + 3i)(1 - i)$ (b) The magnitude of $(5 - 4i)$

(a) $(2+3i)(1-i)$

(b) $|5-4i|$

$(2+3i)(1-i)$
 $5+i$

$|5-4i|$
 $\sqrt{41}$

Note that i can also be used to enter i .

SETTINGS

Change the calculator settings or RESET.



Calc Settings
System Settings
Reset
Get Started

Input/Output
Angle Unit
Number Format
Engineer Symbol

MathI/MathO
MathI/DecimalO
LineI/LineO
LineI/DecimalO

Change to always decimal output

Input/Output
Angle Unit
Number Format
Engineer Symbol

Degree
Radian
Gradian

Change angle measure

Input/Output
Angle Unit
Number Format
Engineer Symbol

Fix
Sci
Norm :2

Change output decimal places, sig figs etc.

Fraction Result
Complex Result
Decimal Mark
Digit Separator

Mixed Fraction
Improp Fraction

Change fraction output format

Calc Settings
System Settings
Reset
Get Started

Contrast
Auto Power Off
MultiLine Font
QR Code

Change screen contrast, power-off timer, font size etc.

Calc Settings
System Settings
Reset
Get Started

Settings & Data
Variable Memory
Initialize All

Reset data. Variable memory or everything.

Notice the settings for rectangular and magnitude-direction format for Complex number output.
Note the default [settings](#) may not display decimals, see [FORMAT](#) or ["](#).

Want to find something?

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T

CATALOG

Find duplicate and further functionality.



Func Analysis
Probability
Numeric Calc
Angle/Coord/Sexa

Derivative(d/dx)
Integration(f)
Summation(Σ)
Logarithm(logab)

Select calculus,
summation or
different logarithms.

Func Analysis
Probability
Numeric Calc
Angle/Coord/Sexa

%
Factorial(!)
Permutation(P)
Combination(C)

%, factorials, nPr,
nCr and random
numbers.

Func Analysis
Probability
Numeric Calc
Angle/Coord/Sexa

Absolute Value
Round Off

HCF, LCM, modulus
and recurring
decimal input.

Func Analysis
Probability
Numeric Calc
Angle/Coord/Sexa

Degrees
Radians
Gradians
Rect to Polar

Use correct angle
format without
changing settings.

Hyperbolic/Trig
Engineer Symbol
Sci Constants
Unit Conversions

sinh
cosh
tanh
sinh⁻¹

Hyperbolic functions
and their inverses.

Hyperbolic/Trig
Engineer Symbol
Sci Constants
Unit Conversions

Length
Area
Volume
Mass

Convert
measurements.

Statistics
Func Analysis
Probability
Numeric Calc

Summation
Mean/Var/Dev...
Min/Max/Quartile
Norm Dist

Adapted menu with
additional functionality.

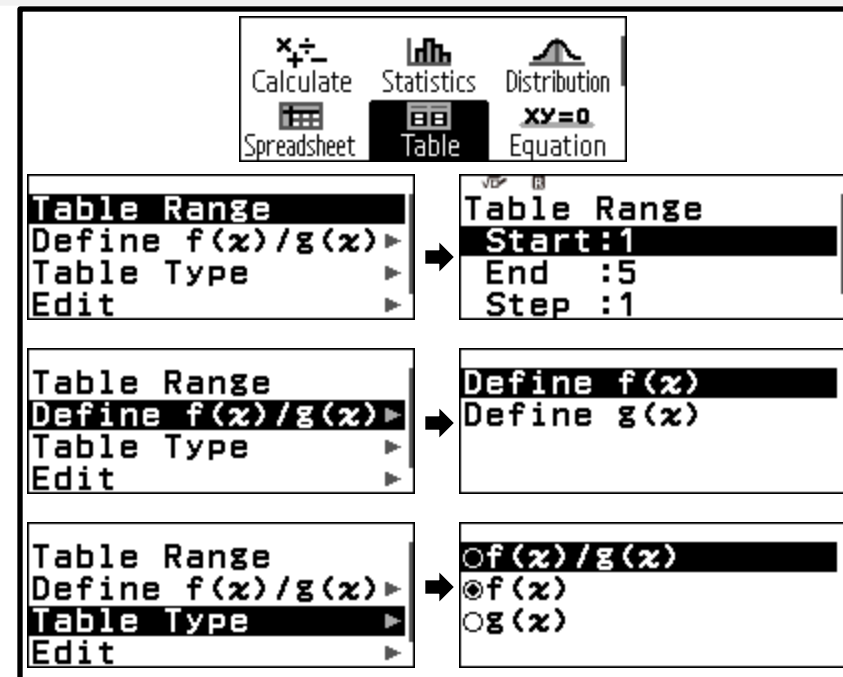
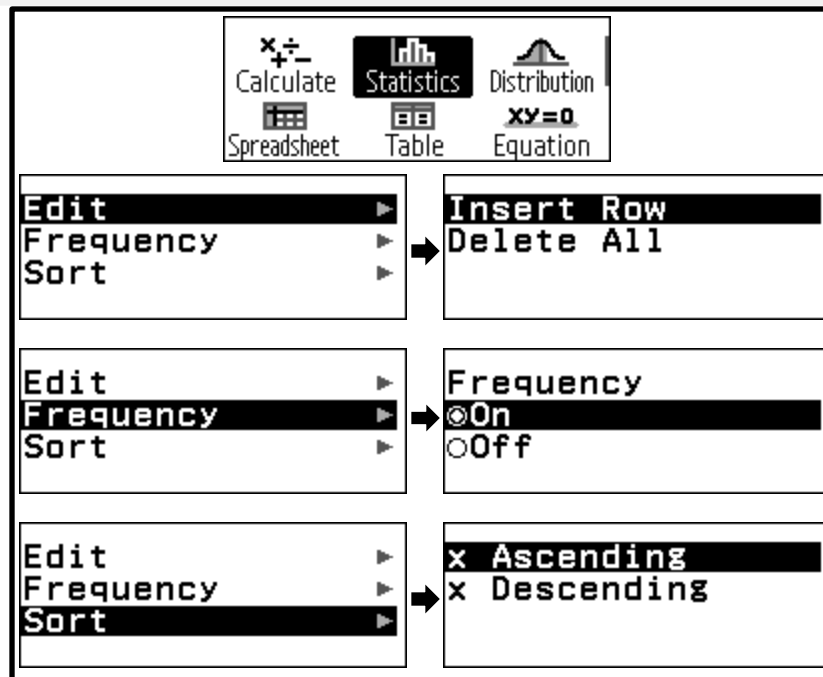
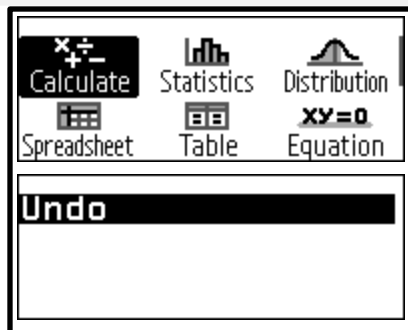
Note that T menu changes for different apps. e.g. Statistics, with additional functionality listed first.

Want something useful?

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TOOLS

Additional tools for different apps or UNDO.

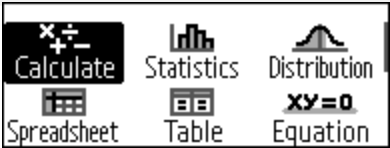


It responds according to the different apps, allowing additional settings to be changed.

W

HOME

Displays the app screen, where applications can be selected.



Normal calculation
You will use this the most.



Use data and frequency tables to find mean, deviations, regression lines.



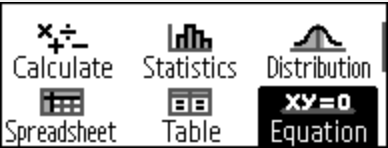
Calculate binomial, normal and Poisson probabilities.



Input data and use formulae.



Create a table of values for one or two functions.



Solve Sim. Eq., polynomials and use Solver.



Solve quadratic, cubic and quartic inequalities.



Manipulate complex numbers and convert between forms.



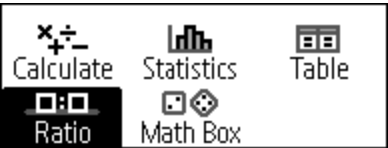
Calculate and convert numbers using different bases.



Manipulate up to 4x4 matrices, find determinants etc.



Manipulate 2D and 3D vectors, find angles, dot product etc.



Find a missing variable value from 2 equivalent ratios e.g.
 $\frac{A}{B} = \frac{x}{D}$



Simulate dice rolls and coin tosses.